PTO/SB/57 (02-09)
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(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: 1248-0819PUS1

Date: July 23, 2010

1. ☑ This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 7,702,323 B2 issued April 20, 2010. The request is made by:
   ☑ patent owner. ☐ third party requester.

2. ☑ The name and address of the person requesting reexamination is:
   Michael R. Cammarata
   Birch, Stewart, Kolasch & Birch, LLP
   8110 Gatehouse Road, Suite 100 East, P.O. Box 747, Falls Church, VA 22040-0747

3. ☐ a. A check in the amount of $_____ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);
   ☑ b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. 02-2448 ; **or**
   ☐ c. Payment by credit card. Form PTO-2038 is attached.

4. ☐ Any refund should be made by ☐ check or ☐ credit to Deposit Account No. 02-2448 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.

5. ☑ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4)

6. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
   ☐ Landscape Table on CD

7. ☐ Nucleotide and/or Amino Acid Sequence Submission
   If applicable, items a. – c. are required.
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
      ii. ☐ paper
   c. ☐ Statements verifying identity of above copies

8. ☐ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.

9. ☑ Reexamination of claim(s) 1 is requested.

10. ☑ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.

11. ☑ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.
SEND TO: Mail Stop *Ex Parte* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

12. ☑ The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1)
b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2).

13. ☐ A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e)

14. ☐ a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
The name and address of the party served and the date of service are:

_____

_____

_____

Date of Service: _____; **or**

☐ b. A duplicate copy is enclosed because service on patent owner was not possible. An explanation of the efforts made to serve patent owner **is attached**. See MPEP 2220.

15. Correspondence Address: Direct all communications about the reexamination to:

☑ The address associated with Customer Number: 02292

OR

☐ Firm or Individual Name _____

Address

City	State	Zip

Country

Telephone	Email

16. ☐ The patent is currently the subject of the following concurrent proceeding(s):

☐ a. Copending reissue Application No. _____
☐ b. Copending reexamination Control No. _____
☐ c. Copending Interference No. _____
☐ d. Copending litigation styled:

_____

_____

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

_____ July 23, 2010
Authorized Signature — Date

Michael R. Cammarata — 39491
Typed/Printed Name — Registration No.

☑ For Patent Owner Requester
☐ For Third Party Requester

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/553,345

Filing Date: October 14, 2005

Inventors: Kenji SAKAMOTO

Patent No.: 7,702,323 B2

Date of Issue: April 20, 2010

For: WIRELESS CONTROL SYSTEM, CONTROL DEVICE, CONTROLLABLE DEVICE DEVICE CONTROL METHOD, CONTROL PROGRAM, AND COMPUTER READABLE RECORDING MEDIUM CONTAINING THE SAME

REQUEST FOR REEXAMINATION UNDER 37 CFR § 1.510

Mail Stop Ex ParteReexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

This is a request for Ex Parte Reexamination pursuant to 37 C.F.R. § 1.510 of U.S. Patent No. 7,702,323, issued on April 20, 2010, entitled WIRELESS CONTROL SYSTEM, CONTROL DEVICE, CONTROLLABLE DEVICE DEVICE CONTROL METHOD, CONTROL PROGRAM, AND COMPUTER READABLE RECORDING MEDIUM CONTAINING THE SAME.

The patent owner, SHARP KABUSHIKI KAISHA (hereinafter the "Requestor"), respectfully requests an Ex Parte Reexamination of claim 1 of U.S. Patent No. 7,702,323 and respectfully requests issuance of a reexamination certificate affirming the patentability of claim 1 of U.S. Patent No. 7,702,323.

The USPTO is hereby authorized to charge any fee deficiency or credit any overpayment to Deposit Account No. 02-2448.

I. REQUIREMENTS UNDER 37 C.F.R. § 1.510

As this Request satisfies each requirement of 37 C.F.R. § 1.510, the Requestor respectfully requests that the USPTO grant this reexamination a filing date pursuant to 37 C.F.R. § 1.510(d).

A. 37 C.F.R. § 1.510(a) – Required Fees

The USPTO is hereby authorized to charge the fee of $2,520.00, as set forth in 37 C.F.R. § 1.20(c)(1), to undersigned's Deposit Account No. 02-2448. (See C.F.R. § 1.510(a).) Any additional fees may also be charged to the undersigned's Deposit Account No. 02-2448.

B. 37 C.F.R. § 1.510(b) – Ex Parte Requirements

Pursuant to 37 C.F.R. § 1.510(b), the Requestor provides an identification of claim(s) for which reexamination is respectfully requested along with an explanation of the pertinency and applicability of the prior art, a statement of SNQs, copies of prior art, and a copy of U.S. Patent No. 7,702,323. (See C.F.R. § 1.510(b).)

1. 37 C.F.R. § 1.510(b)(1) – Statement of Substantial New Questions

JP 2-226898 was made of record in a foreign application (Japanese Application No. 2004-119590) on the same day (March 2, 2010) the Issue Fee was paid in this U.S. application. JP 2-226898 was not of record in the file of U.S. Patent No. 7,702,323. JP 2-226898 discloses, *inter alia*, a remote controller that outputs an operation code for a television receiver, where the operation code is different from the operation code for a VTR (see lines 1-3 of the partial translation of JP 2-226898). Because the teachings of JP 2-226898 was not applied in any rejection of the claims during the prosecution of U.S. Patent No. 7,702,323, a substantial new question of patentability is raised by JP 2-226898.

Detailed Explanation under 37 C.F.R. § 1.510(b) for Independent Claim 1:

In the Notice of Allowance dated December 7, 2009, the Examiner states that:

> "Regarding claims 1, 8, and 13, the cited prior arts, either alone or in combination, fail to teach the first command is control data transmitted to a first controlled device by the controlling device; the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device, in combination with all of other limitations in the claims." (See Notice of Allowance dated December 7, 2009, page 2.)

JP 2-226898 discloses that "the microprocessor 10 first identifies based on the header whether or not the inputted operation code is for the television receiver 1. When the operation code is for the television receiver 1, the microprocessor 10 causes the television receiver 1 to operate in accordance with the operation code. However, if the operation code is not for the television receiver 1, the microprocessor 10 sends this operation code to the microprocessor 11 of the VTR 2 via the system cable 3" (see lines 8-16 of the partial translation of JP 2-226898).

Therefore, JP 2-226898 fails to explicitly disclose "the first command is control data transmitted to a first controlled device by the controlling device; the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device."

More specifically, JP 2-226898 only broadly discloses the use of a single "operation code" for either operating a television receiver or sending the same operation code to a VTR if the operation code was not intended for the television receiver. Therefore, at most, JP 2-226898 may be said to disclose a single code for controlling a device.

In contrast to the claimed invention of independent claim 1, JP 2-226898 fails to disclose a control command that includes one of a first command, a second command, and a third command, wherein "the first command is control data transmitted to a first controlled device by the controlling device; the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device" because JP 2-226898 merely discloses a single operation code for either operating a television receiver or for being sent to a VTR. Further, JP 2-226898 fails to even mention a total of three commands, nevertheless failing to mention the specifics of each of the three commands. Therefore, JP 2-226898 fails to make up for the deficiencies of the cited prior art in regards to independent claim 1.

Thus, independent claim 1 remains allowable and the patent remains valid.

2. 37 C.F.R. § 1.510(b)(2) – Identification of Claim(s)

In accordance with 37 C.F.R. § 1.510, reexamination of claim 1 of U.S. Patent No. 7,702,323 is respectfully requested, in view of the following reference:

Tokukaihei, Japanese Patent Application Publication No. 2-226898 (hereinafter JP 2-226898)

Reexamination of claim 1 is respectfully requested in view of JP 2-226898. U.S. Patent No. 7,702,323 is still enforceable.

37 C.F.R. § 1.510(b) through 1.510(b)(2) states that "Any request for reexamination must include...a detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested." However, MPEP 2205 states that "This would be met, for example, by a statement that the art submitted in the prior art citation under 37 CFR 1.501 was made of record in a foreign or domestic application having the same or related invention to that of the patent."

This application claims priority to at least Japanese Application No. 2004-117292 (filed on April 12, 2004). Japanese Application No. 2004-119590 is a divisional application of the corresponding Japanese Application No. 2004-117292.

In this application, Examiner Huy D. Nguyen mailed a Notice of Allowance on December 7, 2009. Further, the Issue Fee was paid on March 2, 2010. Also on March 2, 2010, JP 2-226898 was first cited in Japanese Application No. 2004-119590.

On April 16, 2010, an Information Disclosure Statement (IDS) was submitted to the USPTO along with the Request for Continued Examination (RCE), the IDS cited JP 2-226898 on an SB/08 Form. However, through an inadvertent error, a necessary Petition to withdraw the application from issue (because the issue fee was already paid) was not filed with the RCE and IDS. U.S. Patent No. 7,702,323 issued without consideration of JP 2-226898.

Accordingly to MPEP 2205 (as stated above), the required statement would be met if "the art submitted in the prior art citation under 37 CFR 1.501 was made of record in a foreign or domestic application having the same or related invention to that of the patent." Thus, based on the facts (as illustrated in detail above), following statement is made and is sufficient to meet the requirements under 37 CFR 1.501(b)(2):

The art submitted in the prior art citation under 37 CFR 1.501 (JP 2-226898) was made of record in a foreign application (Japanese Application No. 2004-119590) having the same or related invention to that of U.S. Patent No. 7,702,323.

3. 37 C.F.R. § 1.510(b)(3) – Prior Art

A complete listing of the prior art submitted with this Request is provided in the attached SB/08 Form, together with a copy of each listed document relied upon and accompanied by an English language translation of all the necessary and pertinent parts of any non-English language patent or printed publication. (See MPEP 2214.) The complete listing of prior art submitted includes:

Tokukaihei, Japanese Patent Application Publication No. 2-226898 (JP 2-226898) together with a partial English translation of exemplary portions of the non-English

language information that may be relevant to the issue any substantial new question(s) of patentability.

4. 37 C.F.R. § 1.510(b)(4) – Copy of U.S. Patent No. 7,702,323

A copy of the entire U.S. Patent No. 7,702,323 – including the front face, drawings, and specification/claims (in double column format) – is provided herewith. The Requestor is not aware of any reexamination certificates or disclaimers currently issued for U.S. Patent No. 7,702,323. The Requestor is not aware of any certificate of corrections currently issued for U.S. Patent No. 7,702,323.

5. 37 C.F.R. § 1.510(b)(5) – Certification

No certification is necessary in this Request for reexamination because the Request is made by the patent owner.

Requester respectfully submits that reexamination of U.S. Patent No. 7,702,323 is warranted in view of the showing in this Request that substantial new questions of patentability are presented. Early notice of the grant of this Request is earnestly solicited.

Dated: July 23, 2010

Respectfully submitted,

By _____

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Registration No.: 39,491
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P.O. Box 747
Falls Church, Virginia 22040-0747
(703) 205-8000

US007702323B2

(12) **United States Patent**
Sakamoto

(10) **Patent No.: US 7,702,323 B2**
(45) **Date of Patent: Apr. 20, 2010**

(54) **WIRELESS CONTROL SYSTEM, CONTROL DEVICE, CONTROLLABLE DEVICE DEVICE CONTROL METHOD, CONTROL PROGRAM, AND COMPUTER READABLE RECORDING MEDIUM CONTAINING THE SAME**

(75) Inventor: **Kenji Sakamoto**, Chiba (JP)

(73) Assignee: **Sharp Kabushiki Kaisha**, Osaka-Shi (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 485 days.

(21) Appl. No.: **10/553,345**

(22) PCT Filed: **Apr. 15, 2004**

(86) PCT No.: **PCT/JP2004/005435**

§ 371 (c)(1),
(2), (4) Date: **Oct. 14, 2005**

(87) PCT Pub. No.: **WO2004/093485**

PCT Pub. Date: **Oct. 28, 2004**

(65) **Prior Publication Data**

US 2006/0234659 A1 Oct. 19, 2006

(30) **Foreign Application Priority Data**

Apr. 17, 2003 (JP) 2003-112994
Apr. 12, 2004 (JP) 2004-117292

(51) **Int. Cl.**
H04M 3/00 (2006.01)

(52) **U.S. Cl.** **455/420**; 455/419; 455/550.1; 455/556.1; 455/411; 455/410

(58) **Field of Classification Search** 455/420, 455/419, 550.1, 556.1, 411, 410, 422.1; 725/81
See application file for complete search history.

(56) **References Cited**

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(Continued)

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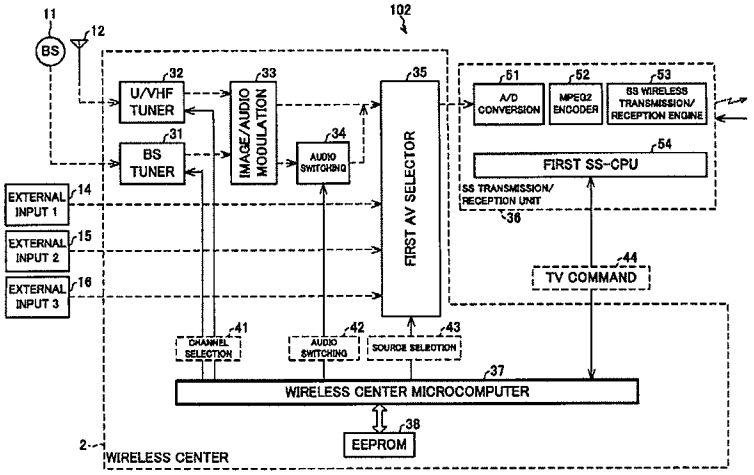
(Continued)

Primary Examiner—Joseph H Feild
Assistant Examiner—Huy D Nguyen
(74) *Attorney, Agent, or Firm*—Birch, Stewart, Kolasch & Birch, LLP

(57) **ABSTRACT**

The wireless control system of the present invention constitutes a wireless AV system (**101**) which forms a wireless transmission network (**1**) in which a wireless center unit (**102**) and a TV main body unit (**103**) are connected with each other by a wireless LAN. The wireless center unit (**102**) transmits to the TV main body unit (**103**) control data having, in a control command, a discrimination code for discriminating between devices in the wireless AV system (**101**). The TV main body unit (**103**) reads out the discrimination code included in the received control data, discriminates a device to carry out the control command included in the control data, and transmits the control data to the discriminated device. As a result, even when the number of controlled devices that a controlling device has to control increases, a throughput of the controlling device for discrimination of control data does not increase, and therefore the whole system constituted of the controlling device and the controlled devices can be smoothly operated.

19 Claims, 12 Drawing Sheets



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WO	WO-01/10098	A1	2/2001
WO	WO-02/098060	A1	12/2002
WO	WO-03/007594	A1	1/2003

* cited by examiner

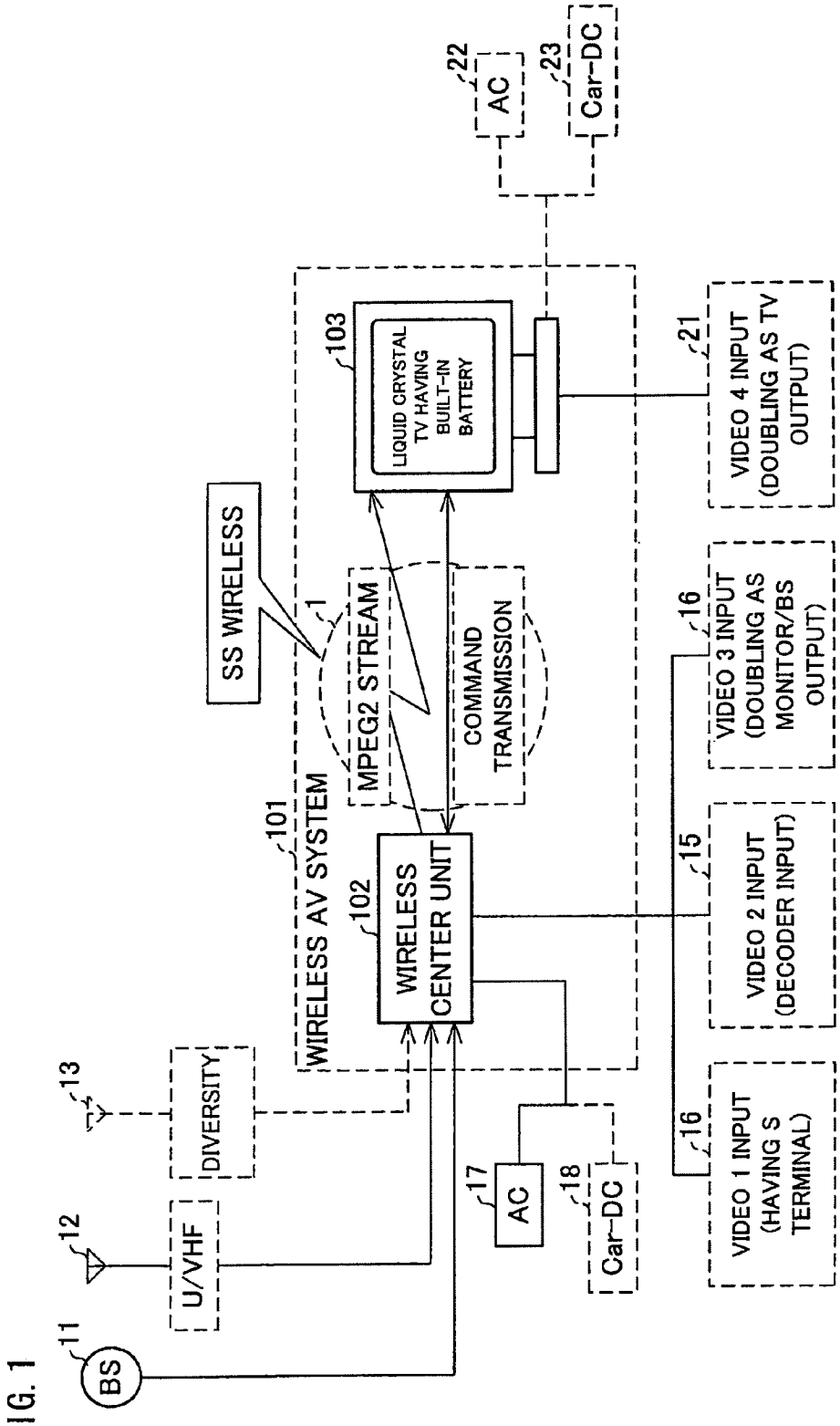

BS
11
U/VHF
12
DIVERSITY
13
WIRELESS AV SYSTEM
101
WIRELESS CENTER UNIT
102
SS WIRELESS
1
MPEG2 STREAM
COMMAND TRANSMISSION
LIQUID CRYSTAL TV HAVING BUILT-IN BATTERY
103
AC
17
Car-DC
18
AC
22
Car-DC
23
VIDEO 1 INPUT (HAVING S TERMINAL)
16
VIDEO 2 INPUT (DECODER INPUT)
15
VIDEO 3 INPUT (DOUBLING AS MONITOR/BS OUTPUT)
16
VIDEO 4 INPUT (DOUBLING AS TV OUTPUT)
21

FIG. 1

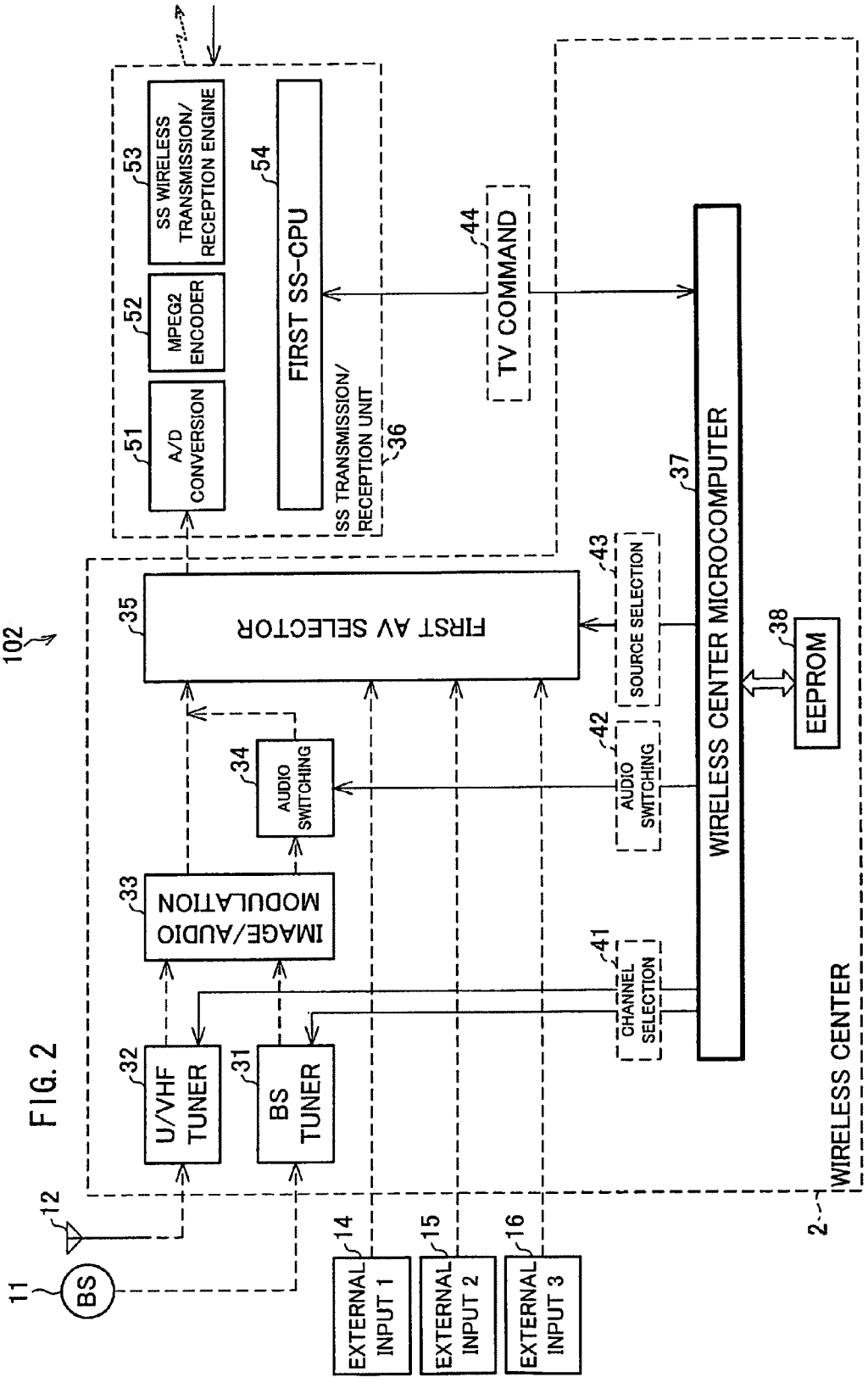

11
BS
12
102
2
WIRELESS CENTER
EXTERNAL INPUT 1
14
EXTERNAL INPUT 2
15
EXTERNAL INPUT 3
16
U/VHF TUNER
32
BS TUNER
31
IMAGE/AUDIO MODULATION
33
AUDIO SWITCHING
34
FIRST AV SELECTOR
35
SS TRANSMISSION/ RECEPTION UNIT
36
A/D CONVERSION
51
MPEG2 ENCODER
52
SS WIRELESS TRANSMISSION/ RECEPTION ENGINE
53
FIRST SS-CPU
54
TV COMMAND
44
WIRELESS CENTER MICROCOMPUTER
37
EEPROM
38
SOURCE SELECTION
43
AUDIO SWITCHING
42
CHANNEL SELECTION
41

FIG. 2

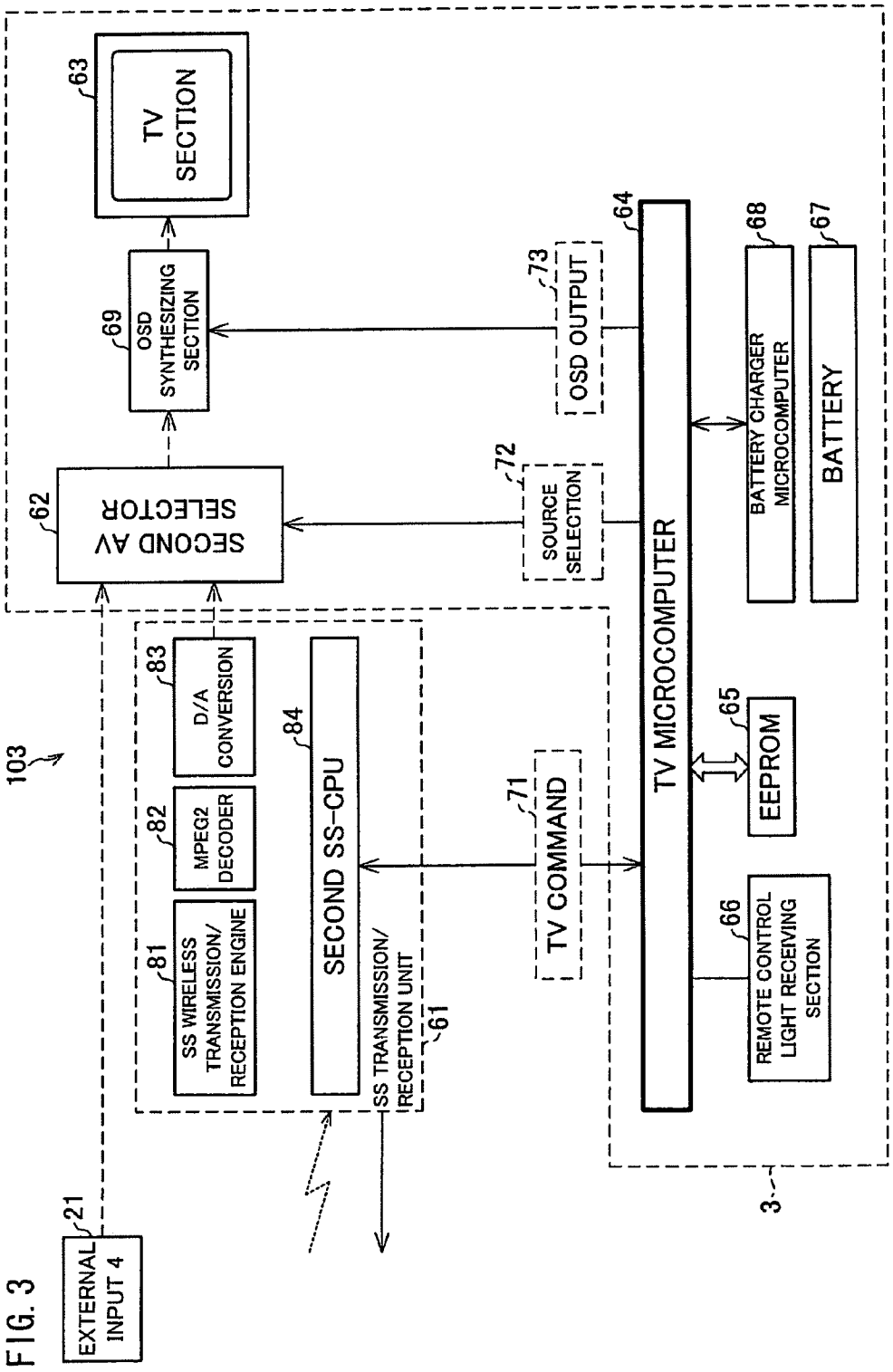

103
EXTERNAL INPUT 4
21
SECOND AV SELECTOR
62
TV SECTION
63
OSD SYNTHESIZING SECTION
69
SS WIRELESS TRANSMISSION/ RECEPTION ENGINE
81
MPEG2 DECODER
82
D/A CONVERSION
83
SECOND SS-CPU
84
SS TRANSMISSION/ RECEPTION UNIT
61
SOURCE SELECTION
72
OSD OUTPUT
73
TV COMMAND
71
TV MICROCOMPUTER
64
EEPROM
65
REMOTE CONTROL LIGHT RECEIVING SECTION
66
BATTERY CHARGER MICROCOMPUTER
68
BATTERY
67
3

FIG. 3

FIG. 4(a)

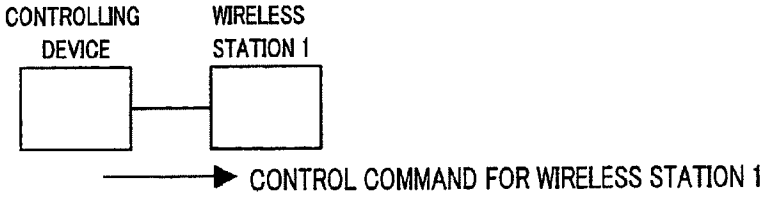


FIG. 4(b)

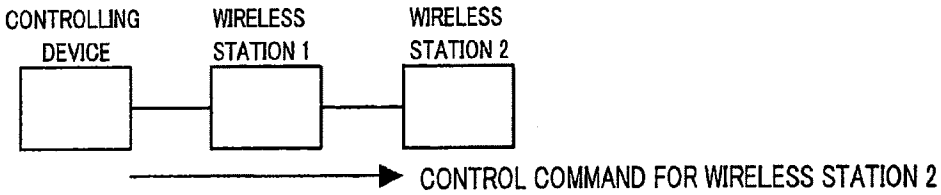


FIG. 4(c)

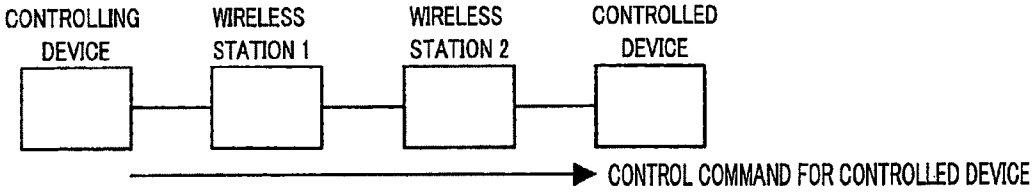


FIG. 5

CONVERSION RULE

KEY CODE: 0xFF

DATA:

0x00 ~ 0xFD → NOT CONVERTED

0xFE → 0xFE 0x00

0xFF → 0xFE 0x01

FIG. 6

EXAMPLE OF FORMAT OF CONTROL DATA

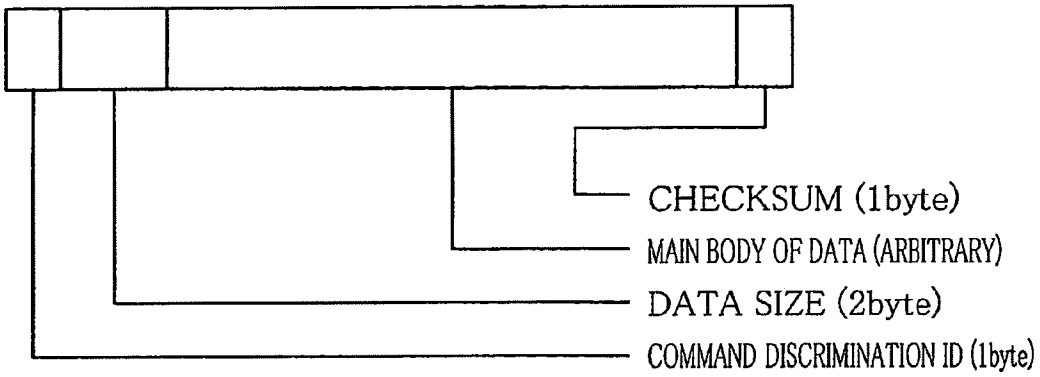


FIG. 7(a)

CONTROL COMMAND FOR WIRELESS STATION 1 (COMMAND DISCRIMINATION ID=1)

【BEFORE CONVERSION】

0x01 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x01

【AFTER CONVERSION】

0xFF 0x01 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x01

FIG. 7(b)

CONTROL COMMAND FOR WIRELESS STATION 2 (COMMAND DISCRIMINATION ID=2)

【BEFORE CONVERSION】

0x02 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x02

【AFTER CONVERSION】

0xFF 0x02 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x02

FIG. 7(c)

CONTROL COMMAND FOR CONTROLLED DEVICE (COMMAND DISCRIMINATION ID=3)

【BEFORE CONVERSION】

0x03 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x03

【AFTER CONVERSION】

0xFF 0x03 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x03

FIG. 7(d)

CONTROL COMMAND FOR EXTERNAL DEVICE (COMMAND DISCRIMINATION ID=4)

【BEFORE CONVERSION】

0x04 0x05 0x01 0xFE 0x02 0xFF 0xA0 0x04

【AFTER CONVERSION】

0xFF 0x04 0x05 0x01 0xFE 0x00 0x02 0xFE 0x01 0xA0 0x04

FIG. 8 (a)

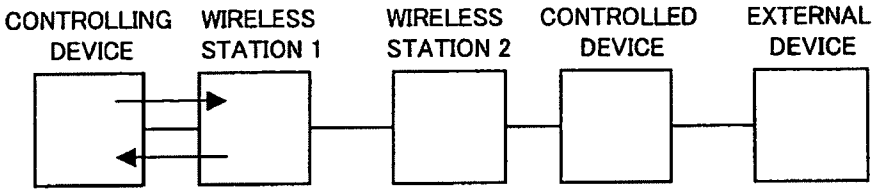

CONTROLLING DEVICE
WIRELESS STATION 1
WIRELESS STATION 2
CONTROLLED DEVICE
EXTERNAL DEVICE

FIG. 8 (b)

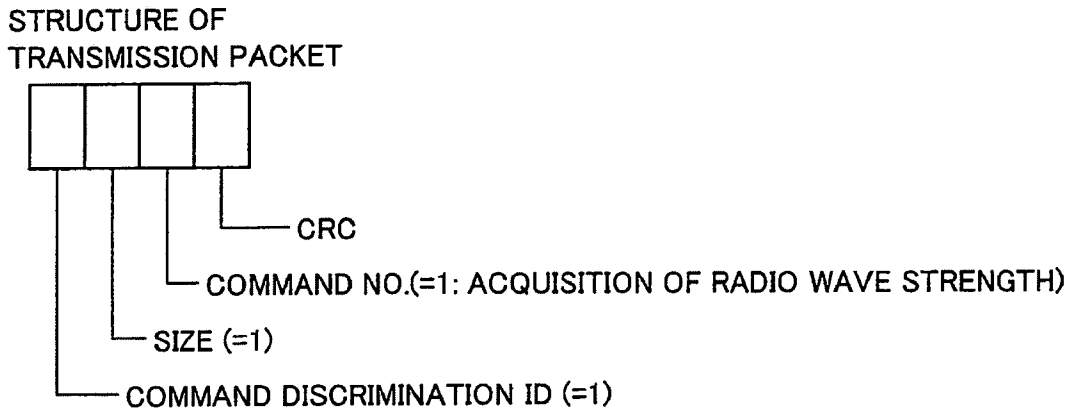

STRUCTURE OF TRANSMISSION PACKET
CRC
COMMAND NO.(=1: ACQUISITION OF RADIO WAVE STRENGTH)
SIZE (=1)
COMMAND DISCRIMINATION ID (=1)

FIG. 9(a)

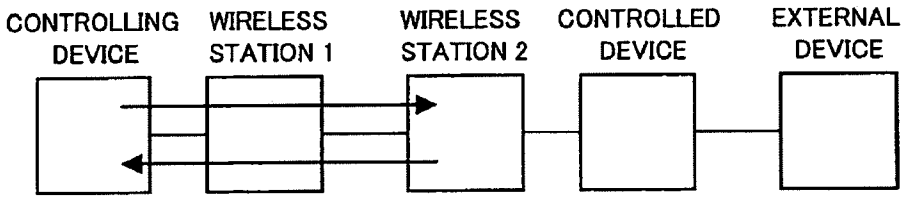

CONTROLLING DEVICE
WIRELESS STATION 1
WIRELESS STATION 2
CONTROLLED DEVICE
EXTERNAL DEVICE

FIG. 9(b)

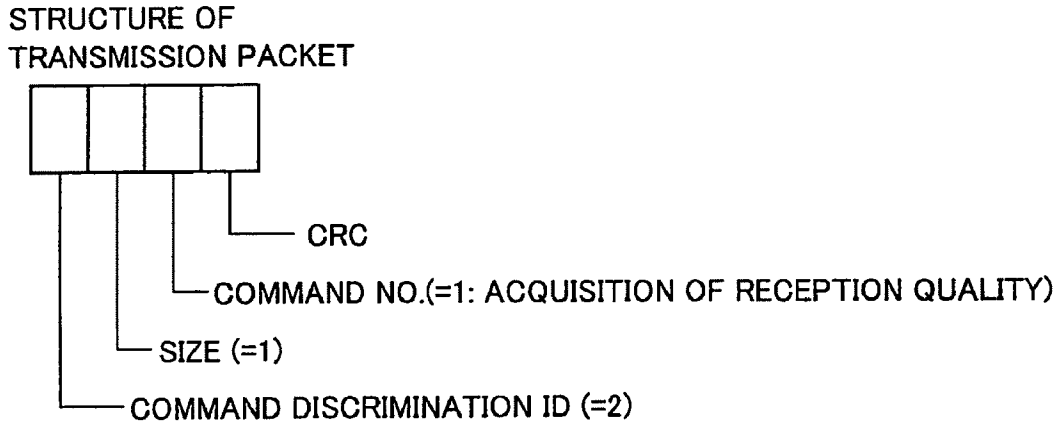

STRUCTURE OF TRANSMISSION PACKET
CRC
COMMAND NO.(=1: ACQUISITION OF RECEPTION QUALITY)
SIZE (=1)
COMMAND DISCRIMINATION ID (=2)

FIG. 10(a)

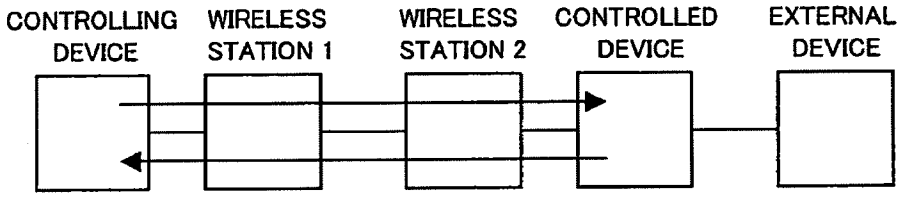


FIG. 10(b)

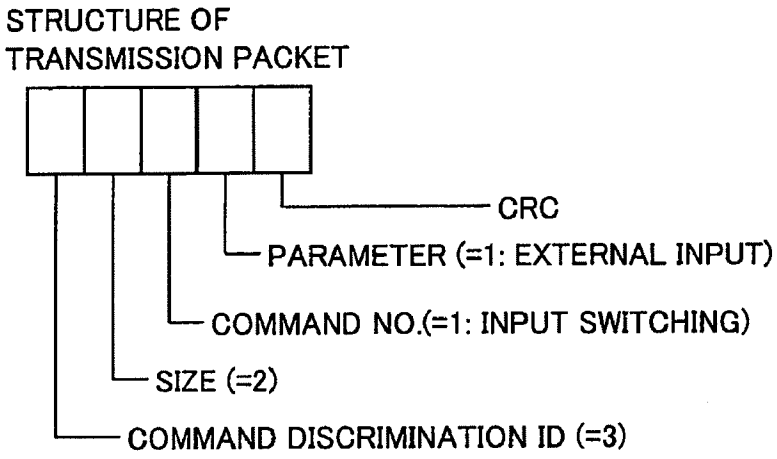


FIG. 11 (a)

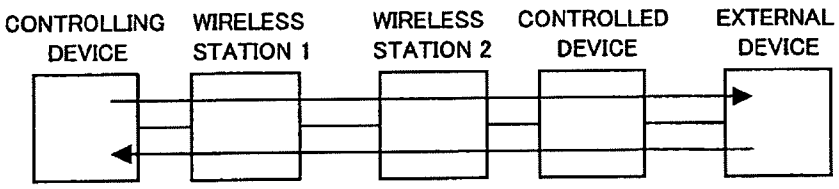
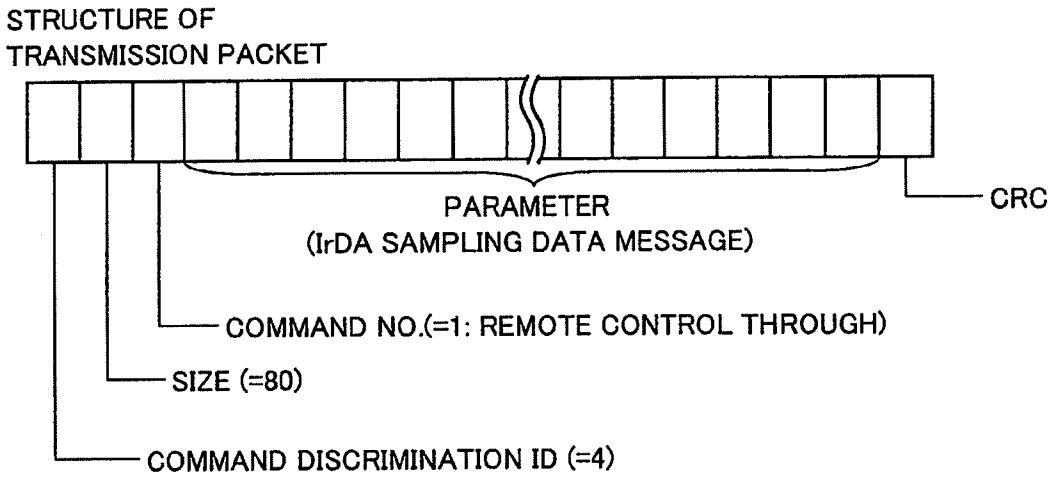


FIG. 11 (b)



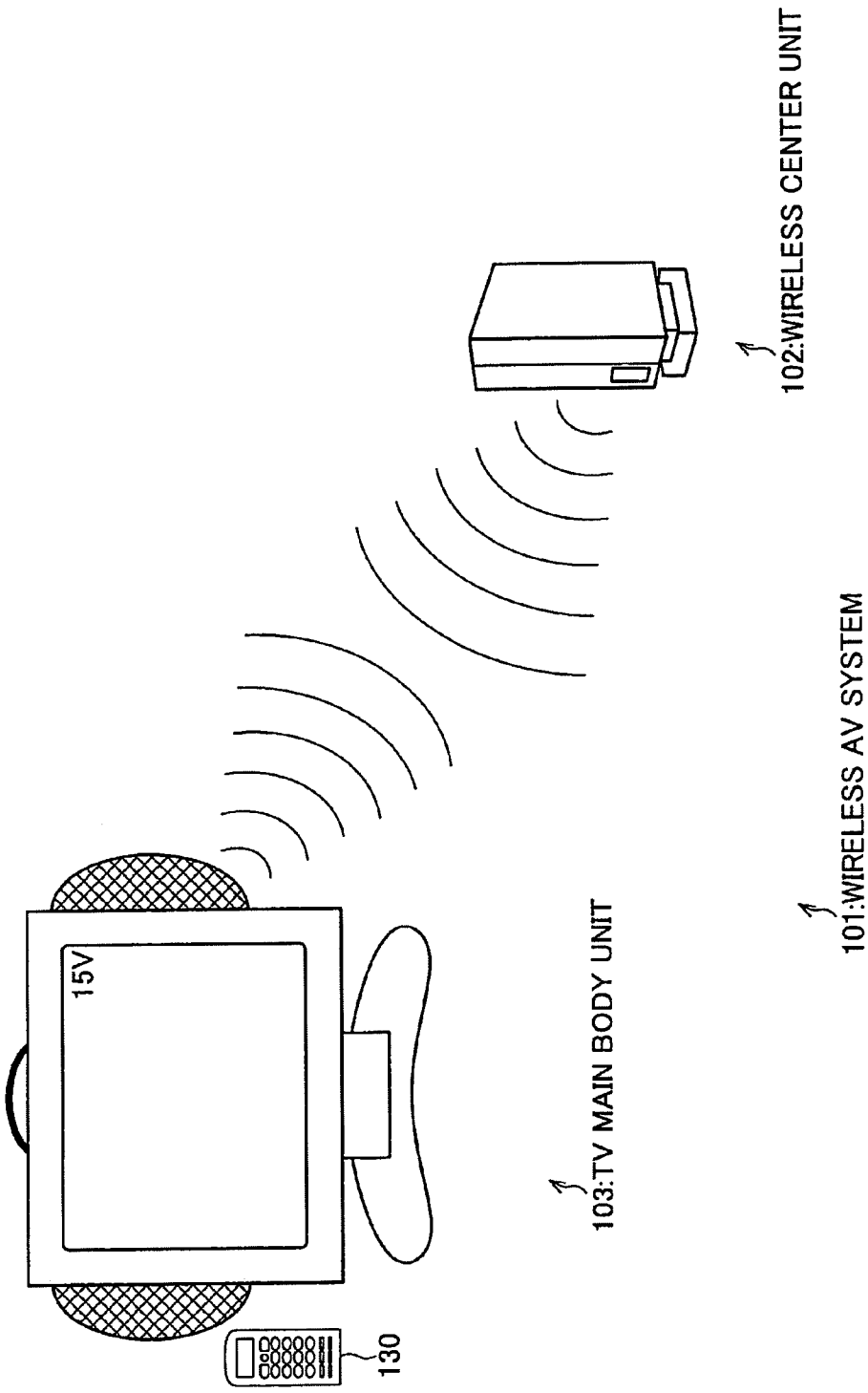

102:WIRELESS CENTER UNIT
101:WIRELESS AV SYSTEM
103:TV MAIN BODY UNIT
15V
130

FIG. 12

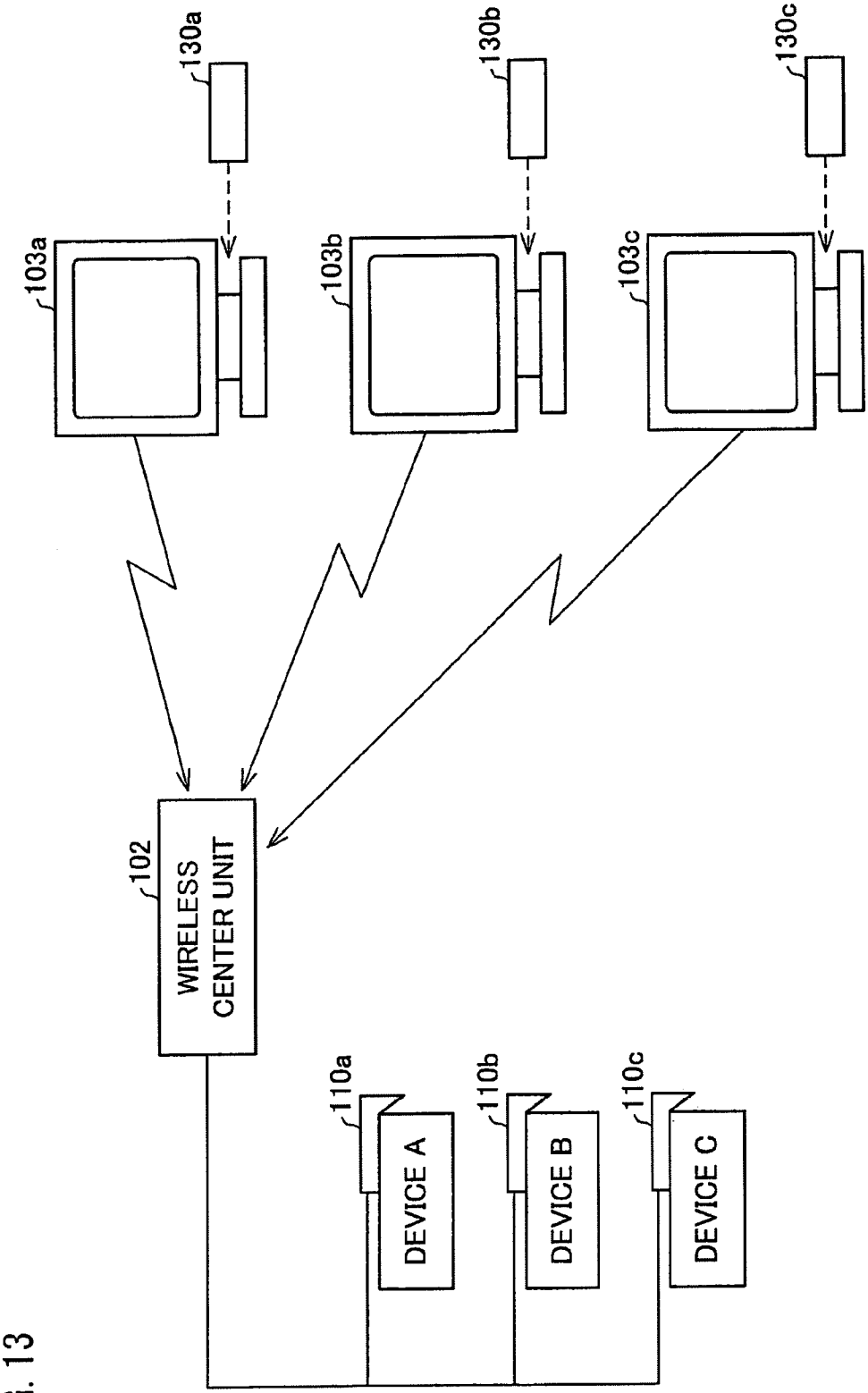

130a
130b
130c
103a
103b
103c
102
WIRELESS CENTER UNIT
110a
110b
110c
DEVICE A
DEVICE B
DEVICE C

FIG. 13

WIRELESS CONTROL SYSTEM, CONTROL DEVICE, CONTROLLABLE DEVICE DEVICE CONTROL METHOD, CONTROL PROGRAM, AND COMPUTER READABLE RECORDING MEDIUM CONTAINING THE SAME

TECHNICAL FIELD

The present invention relates to: a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device; a controlling device; controlled devices; method of controlling devices; a control program; and a storage medium readable by a computer, for storing the program.

BACKGROUND ART

Recently, with the explosive prevalence of the Internet, a LAN (Local Area Network) is frequently constructed in offices, houses and the like.

Because cable wiring is troublesome, there is an increasing need for so called wireless LANs which construct a LAN wirelessly, which is aided by progress in digital wireless communication technologies. Further, wireless communication devices which constitute such a wireless LAN are expected to be used in large numbers, because the devices can be used in mobile terminals, such as notebook computers in mobile environments.

As a representative technology of the wireless LAN, there is IEEE 802.11 which has already been standardized by IEEE (Institute of Electrical and Electronics Engineers). This standardized technology defines from a physical layer to a MAC (Media Access Control) layer, being a lower layer of a data link in an OSI model, and can be replaced with Ethernet™ which is a wired LAN transmission channel. Further, IEEE 802.11 can provide a roaming function as an additional function due to being wireless.

Recently, in order to transmit/receive video image data or audio data wirelessly, a wireless AV system using such a wireless LAN is proposed.

Generally, a wireless AV system has a problem that video image data to be transmitted/received deteriorates due to transmission errors.

Patent Document 1 (PCT international publication No. WO 01/006795 (publication date; Jan. 25, 2001)) discloses an image decoding method in which a transmission error is detected by an image header included in video image data, and when a transmission error is detected, video image data is temporarily stored, repetition of a header different from the image header is detected, and based on this repeated header, temporarily stored video image data is decoded, and thereby deterioration of the video image data is prevented.

In a conventional wireless AV system, when one controlling device (such as an AV amplifier) controls a plurality of controlled devices (such as a video deck, a DVD player, a stereo, and a TV), the controlling device transmits control data by wireless to each of the controlled devices. Namely, the controlling device causes a data transmitting/receiving unit thereof to sort and transmit control data to each of the controlled devices.

As a result, the more controlled devices one controlling device has to control, the larger throughput is necessary for sorting of control data items in a data transmitting/receiving unit included in the controlling device, that is, the larger throughput is necessary for discriminating control data items, which makes it difficult for the controlling device to promptly control the controlled devices, with a result that the whole of the wireless AV system does not operate smoothly.

The present invention is made in view of the foregoing problems, and its object is to realize a wireless control system in which, even when the number of controlled devices which the controlling device has to control increases, a throughput for discriminating control data in the controlling side does not increase, and the whole of the wireless AV system can be smoothly operated.

DISCLOSURE OF INVENTION

In order to solve the foregoing problem, the wireless control system of the present invention is constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, wherein the controlling device wirelessly transmits control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, the controlled devices receive the control data transmitted wirelessly from the controlling device, read out the discrimination code included in the received control data, discriminate a controlled device to carry out the control command included in the control data, and transmit the control data to the discriminated controlled device.

Further, the wireless control system is constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, wherein the controlling device includes (i) a control data generating section for generating control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, and (ii) a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication, and the controlled devices include (i) a wireless communication section for receiving the control data from the controlling device, (ii) a discrimination section for reading out the discrimination code included in the received control data and discriminating a controlled device to carry out the control command included in the control data, and (iii) a control data transmission section for transmitting the control data to the controlled device discriminated by the discrimination section.

With these arrangements, the controlling device generates control data having, in a control command, a discrimination code for discriminating between the controlled devices, and the controlled devices use the control data so as to perform discrimination of control data. As a result, even when the number of controlled devices to be controlled by one controlling device increases, a throughput for discriminating control data in the controlling device does not increase.

Therefore, even when the number of the controlled devices increases, the burden of data processing in the controlling device does not increase, so that the controlling device can promptly control each of the controlled devices. As a result, the whole of the wireless AV system can be operated smoothly.

The control data generating section may be arranged so that when generated control data includes the same data as a predetermined key code, the control data generating section

performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

In this case, misidentification of a discrimination code can be avoided, so that the controlling device can always control a suitable controlled device.

Control data generated in the control data generating section may be any one of control data to be transmitted to a control section included in the controlling device, control data to be transmitted to the wireless communication section in the controlling device, control data to be transmitted to a control section included in the controlled devices, and control data to be transmitted to the wireless communication section in the controlled devices.

Further, the control data may include, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state.

Further, the controlled devices of the wireless control system may be arranged as follows.

The controlled devices according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlled devices (i) receiving control data which includes a discrimination code for discriminating between the controlled devices in the system, and (ii) discriminating a controlled device to carry out a control command included in the control data, based on the discrimination code included in the received control data.

Further, the controlled devices according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlled devices including (i) a wireless communication section for receiving from the controlling device control data including a discrimination code for discriminating between the controlled devices in the system, (ii) a discrimination section for reading out a discrimination code included in the received control data and discriminating a controlled device to carry out a control command included in the control data, and (iii) a control data transmission section for transmitting the control data to the controlled device discriminated by the discrimination section.

Further, the controlling device of the wireless control system may be arranged as follows.

The controlling device according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlling device wirelessly transmitting control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system.

Further, the controlling device according to the present invention may be arranged so as to be included in a wireless control system constituted of a controlling device and controlled devices that are wirelessly controlled by the controlling device, the controlling device including (i) a control data generating section for generating control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, and (ii) a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication.

As the wireless communication section, a communication section that transmits control data using a spread spectrum wireless system is preferably used.

Further, as the wireless communication section, a communication section that performs low power, close range, two-way wireless communication such as a wireless LAN, Bluetooth or UWB (Ultra Wide Band) is preferably used.

Note that the wireless control system may be realized by a computer. In this case, a storage medium readable by a computer, for storing a control program which realizes the wireless control system using a computer by causing the computer to function as each of the sections, is also within the scope of the present invention.

For a fuller understanding of the nature and advantages of the invention, reference should be made to the ensuing detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a block diagram illustrating a main structure of a wireless AV system according to an embodiment of the present invention.

FIG. **2** is a block diagram illustrating a main structure of a wireless center unit constituting the wireless AV system illustrated in FIG. **1**.

FIG. **3** is a block diagram illustrating a main structure of a TV main body unit constituting the wireless AV system illustrated in FIG. **1**.

FIG. **4**(*a*) is a schematic diagram illustrating one example of transmission/reception of a control command between the wireless center unit and the TV main body unit.

FIG. **4**(*b*) is a schematic diagram illustrating another example of transmission/reception of a control command between the wireless center unit and the TV main body unit.

FIG. **4**(*c*) is a schematic diagram illustrating a further example of transmission/reception of a control command between the wireless center unit and the TV main body unit.

FIG. **5** is a figure illustrating one example of a key code included in control data in the wireless AV system illustrated in FIG. **1**.

FIG. **6** is a figure illustrating one example of a data format of a control command transmitted/received in the wireless AV system illustrated in FIG. **1**.

FIG. **7**(*a*) is a figure illustrating one example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. **7**(*b*) is a figure illustrating another example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. **7**(*c*) is a figure illustrating a further example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. **7**(*d*) is a figure illustrating a further example of conversion of control data, according to the conversion method and the data structure of control data.

FIG. **8**(*a*) is a schematic diagram illustrating transmission/reception of control data in a case where acquisition of transmitted radio wave strength at a wireless station is intended.

FIG. **8**(*b*) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. **8**(*a*).

FIG. 9(*a*) is a schematic diagram illustrating transmission/reception of control data in a case where acquisition of received radio wave strength at a wireless station is intended.

FIG. 9(*b*) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. 9(*a*).

FIG. 10(*a*) is a schematic diagram illustrating transmission/reception of control data in a case where switching of an external input in a controlled device is intended.

FIG. 10(*b*) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. 10(*a*).

FIG. 11(*a*) is a schematic diagram illustrating transmission/reception of control data in a case where direct remote control of an external device via a controlled device is intended.

FIG. 11(*b*) is a figure illustrating a data structure of control data in the transmission/reception of control data illustrated in FIG. 11(*a*).

FIG. **12** is a figure illustrating a concrete example of the wireless AV system of the present invention.

FIG. **13** is a figure illustrating an applied example of the wireless AV system illustrated in FIG. **12**.

BEST MODE FOR CARRYING OUT THE INVENTION

One embodiment of the present invention is described below with reference to the attached drawings. In the present embodiment, an example in which the wireless controlling system of the present invention is applied to a wireless AV (audio visual) system is described.

FIG. **1** is a block diagram illustrating a main structure of a wireless AV system **101** according to the present embodiment. Here, an example is illustrated in which the wireless AV system **101** is applied to a wireless TV receiving device having a separable display, as illustrated in FIG. **12**.

That is, as illustrated in FIG. **12**, the wireless AV system **101** is constituted of a TV main body unit **103** and a wireless center unit **102**.

The TV main body unit **103** has a wireless TV receiving device including a battery, and a remote controller **130**. The remote controller **130** allows remote control of a video deck or the like connected to the wireless center unit **102** via the TV main body unit **103**.

Further, the wireless center unit **102** is connected with antennas for BS, U/VHF and the like, and AV devices such as a DVD player and a video deck, and image and/or audio data is wirelessly transmitted to the TV main body unit **103**.

The wireless AV system **101** is fully explained below. In the following explanation, "data" means all data items transmitted/received in a general wireless AV system **101**, such as control data, image data, or audio data.

As illustrated in FIG. **1**, the wireless AV system **101** is constituted of the wireless center unit **102** as a base device and the TV main body unit **103** as a portable terminal. A pair of the wireless center unit **102** and the TV main body unit **103** constitutes a wireless transmission network **1**.

The wireless center unit **102** and the TV main body unit **103** have functions of both a controlling device and a controlled device. That is, when the wireless center unit **102** functions as a controlling device, the TV main body unit **103** functions as a controlled device, and when the TV main body unit **103** functions as a controlling device, the wireless center unit **102** functions as a controlled device.

Here, in the wireless transmission network **1**, data is transmitted/received between the wireless center unit **102** and the TV main body unit **103** through a SS (Spread Spectrum) wireless system based on the IEEE 802.11 standard.

The wireless center unit **102** includes antenna terminals (a BS (broadcasting satellite) terminal **11**, a U/VHF antenna terminal **12**, and a diversity terminal **13**), a video **1** input terminal having an S terminal (external input **1**) **14** for connecting a device such as a digital VTR or DVD player, a video **2** input terminal (external input **2**) **15** for a decoder input and a video **3** input terminal (external input **3**) **16** which doubles as a monitor/BS output, and, provided as power sources, an AC power source section **17** and Car-DC power source section **18**.

Note that the wireless center unit **102** is fully explained later.

The TV main body unit **103** includes a video **4** input terminal (external input **4**) **21**, which doubles as a TV output, for connecting a device such as a digital VTR or DVD (Digital Versatile Disc) player, and a power source terminal (not shown) to be connected with an AC power source section **22** and Car-DC power source section **23** which are provided as power sources.

The TV main body unit **103** is a thin display device that is detachable from the wireless center unit **102** and is mobile or portable because of a built-in battery. The TV main body unit **103** is a broad concept including a variety of display devices such as a liquid crystal TV, an inorganic EL (Electroluminescence)/organic EL display, or a plasma display, and is not limited by its display mechanism.

Note that the TV main body unit **103** is fully explained later.

In the present embodiment, the TV main body unit **103** mainly includes a display function, an audio function and the like, and on the other hand the wireless center unit **102** mainly includes a controlling function and the like for controlling a tuner section and the TV main body unit **103**. Note that in the present embodiment, the TV main body unit **103** is explained using a liquid crystal TV as an example of a thin display device. For example, a system illustrated in FIG. **13** is conceivable. FIG. **13** is explained later.

As described above, in the wireless transmission network **1** formed between the wireless center unit **102** and the TV main body unit **103**, data is transmitted/received by a SS wireless method. Here, as a frequency band, the 2.4 GHz band is used. Note that recently the 5 GHz band is available as a frequency band, and the 5 GHz band may be used instead of the 2.4 GHz band.

Moving image data, DVD-Video data, or digital broadcasting data is transmitted from the wireless center unit **102** to the TV main body unit **103**, using an MPEG (Moving Picture Expert Group) 2 image compression format, through a communication line whose capacity is more than 10 Mbps. Further, command (controlling signal) transmission between the wireless center unit **102** and the TV main body unit **103** is performed using the SS wireless method.

Here, MPEG is explained.

When coded streams (bit rows) of MPEG video and MPEG audio, including other coded streams, are applied to a practical application, it is necessary to multiplex, synthesize, and combine the coded streams, including synchronization of the coded streams, and at the same time it is necessary to cause the streams to have a data form suitable for a format or protocol inherent in storage media or a network.

There are two kinds of MPEG2 system: one is a program stream (MPEG2-PS), which constitutes a program as with MPEG1, and the other is a transport stream (MPEG2-TS) which can constitute a plurality of programs.

An MPEG stream is a byte stream in which units such as flags (there are many 1 bit flags) and headers are ordered by 1 byte. All MPEG systems have a common data structure in which information indicative of length is disposed ahead of a data portion whose length is not fixed, and when the data portion is unnecessary, the data portion is skipped or a beginning of the next data group is located, and thereby reliable separated processing can be performed.

In order to prevent an over flow or under flow of image data and audio data on a decoding-side, it is necessary for a device which receives a compressed image and audio signal, based on an MPEG coding method, to synchronize image and audio sampling frequencies on a coding-side with image and audio sampling frequencies or STC (System Time Clock) on the decoding-side.

For that reason, a decoding device synchronizes the image and audio sampling frequencies on the coding-side with the image and audio sampling frequencies on the decoding-side by using PCR (Program Clock Reference) or SCR (System Clock Reference) which are defined by MPEG2 system standard (ISO/IEC standard 13818-1).

Here, the wireless center unit **102** and the TV main body unit **103** of the wireless AV system **101** having the above structure are fully explained below with reference to FIGS. **2** and **3**.

FIG. **2** is a block diagram illustrating an outline of the wireless center unit **102** and FIG. **3** is a block diagram illustrating an outline of the TV main body unit **103**.

As illustrated in FIG. **2**, the wireless center unit **102** is constituted of a wireless center **2**, and an SS transmission/reception unit **36** provided as communication means (communication section) for transmitting data from the wireless center **2** to the TV main body unit **103** (see FIG. **1**) using the SS wireless method, and receiving a command (control command) from the TV main body unit **103**.

The wireless center **2** includes: a BS tuner **31**, connected with the BS terminal **11**, for receiving and selecting BS broadcasting by a channel selection signal; a U/VHF tuner **32**, connected with the U/VHF antenna terminal **12**, for receiving and selecting U/VHF broadcasting by a channel selection signal; an image/audio demodulating section **33** for demodulating an image/audio (AV) signal received and selected by the BS tuner **31** or the U/VHF tuner **32**; an audio switching section **34** for switching, according to an audio switching signal, between a received audio and information concerning TV programs such as EPG (Electrical Program Guide); a first AV selector **35** for selecting, using a source selection signal, (i) image/audio information received (ii) information concerning programs, and (iii) external input information from the video **1** input terminal **14**, the video **2** input terminal (decoder input) **15**, and the video **3** input terminal (which doubles as monitor/BS output) **16**; a wireless center microcomputer **37** for controlling each of the sections; an EEPROM (electrically erasable programmable ROM) **38** which is an electrically rewritable non-volatile memory for storing a variety of data items such as a controlling program of the wireless center microcomputer **37**, communication control data, and a communication channel changing program.

The wireless center microcomputer **37** transmits a channel selection signal **41** to the BS tuner **31** and the U/VHF tuner **32**, transmits an audio switching signal **42** to the audio switching section **34**, transmits a source selection signal **43** to the first AV selector **35**, and transmits and receives a TV command **44** to and from the SS transmission/reception unit **36**.

Further, the wireless center microcomputer **37** also serves as: a control data generating section for generating latermentioned control data; a discriminating section for discriminating a device to be controlled according to a discrimination code included in the control data; and a control data transmission section for transmitting the control data to the discriminated controlled device.

The channel selection signal **41** includes information for specifying a channel of a TV program. Further, the audio switching signal **42** includes information for switching audios such as main audio, sub audio, stereo, monaural and the like. Further, the source selection signal **43** includes information for selecting from an audio/image signal from an external device such as the video **1** input terminal **14** through the video **3** input terminal **16**, and an audio/image signal received by the BS tuner **31** and the U/VHF tuner **32**.

That is, the BS tuner **31** and the U/VHF tuner **32** accept broadcast of a program channel specified by the channel selection signal **41** from the wireless center microcomputer **37**.

Further, the audio switching section **34** switches audios outputted from the image/audio demodulating section **33** to audios specified by the audio switching signal **42** from the wireless center microcomputer **37**.

Further, the first AV selector **35** selects a source (an image/audio signal from an external device, such as via the video **1** input terminal **14**, and an image/audio signal from the BS tuner **31** or U/VHF tuner **32**) specified by the source selection signal **43** from the wireless center microcomputer **37**.

Further, the TV command **44** is a control signal transmitted/received between the wireless center microcomputer **37** and the SS transmission/reception unit **36**, for controlling the whole of the device.

That is, the TV command **44** is generated in the wireless center microcomputer **37** and transmitted to the SS transmission/reception unit **36**, and further is transmitted to the TV main body unit **103** which is a device with which the SS transmission/reception unit **36** communicates. On the other hand, in the wireless center unit **102**, the wireless center microcomputer **37** receives a TV command **71** (see FIG. **3**) from the TV main body unit **103** which communicates via the SS transmission/reception unit **36**.

As a result, in the TV main body unit **103**, by receiving the TV command **44** from the wireless center unit **102** with which the TV main body unit **103** is in communication, each section of the TV main body unit **103** is controlled, and in the wireless center unit **102**, by receiving the TV command **71** (see FIG. **3**) from the TV main body unit **103** with which the wireless center unit **102** is in communication, each section of the wireless center unit **102** is controlled.

Note that in the present embodiment, the wireless center **2** having the BS tuner **31** and the U/VHF tuner **32** as a broadcast tuner is exemplified. However, the wireless center **2** may be arranged so as to have a tuner for receiving analog broadcasting, or a tuner for receiving digital broadcasting. Further, the tuner for receiving digital broadcasting may be a tuner for satellite digital broadcasting, or a tuner for terrestrial digital broadcasting.

The SS transmission/reception unit **36** is constituted of: an A/D conversion section **51** for converting data selected by the first AV selector **35** in the wireless center **2** into a digital signal; an MPEG2 encoder **52** for converting data converted into a digital signal by the A/D conversion section **51** into an MPEG2 image compression format; an SS wireless transmission/reception engine **53** constituted of an SS wireless device and wireless controlling section for transmitting transmission data (such as MPEG2 streams or commands) by the SS wire-

less method; and a first SS-CPU **54** for controlling each section of the SS transmission unit and detecting a state of radio wave.

The SS wireless transmission/reception engine **53** has: a transmitting function for transmitting an MPEG2 stream such as image and/or audio data or a command such as control data to an SS transmission/reception unit **61** (mentioned later in relation to FIG. **3**) of the TV main body unit **103**; and a receiving function for receiving a command such as control data from the SS transmission/reception unit **61**.

Note that in the present embodiment, a program for controlling the wireless center unit **102** is stored in the EEPROM **38** so as to be rewritable. Therefore, by rewriting the program, control contents can be easily changed. The reason for storing the program for controlling the wireless center unit **102** in a rewritable memory is to avoid wasting a time for changing a mask ROM with respect to each debug in system development. Namely, by using a non-volatile memory (e.g. EPROM or EEPROM) as a program ROM, a time for developing or modifying a program is greatly reduced. Further, by downloading a program so as to rewrite program contents of the EEPROM **38**, it becomes easy to upgrade or change the function.

Next, the TV main body unit **103** is fully explained below with reference to FIG. **3**.

As illustrated in FIG. **3**, the TV main body unit **103** is constituted of a TV main body **3**, and an SS transmission/reception unit **61**, which acts as communication means for transmitting a command from the TV main body **3** to the wireless center unit **102** (see FIG. **1**) using the SS wireless method, and for receiving data from the wireless center unit **102**.

The SS transmission/reception unit **61** transmits/receives TV commands **71** and receives an MPEG stream or command transmission data transmitted from the SS transmission/reception unit **36** of the wireless center unit **102**, and decodes (restores) the received MPEG stream and the like into the original data. The SS transmission/reception unit **61** is fully explained later.

The TV main body **3** is constituted of: a second AV selector **62** for selecting between data restored by the SS transmission/reception unit **61** and an external AV signal inputted via the video **4** input terminal **21**, which doubles as a TV output; a TV section **63** (a part of informing means) constituted of LCD or the like for displaying an image signal and outputting an audio signal; a TV microcomputer **64** (a part of informing means) for controlling the whole of the device, by transmitting/receiving TV commands **71** and transmitting a source selection signal **72**, an OSD (On Screen Display) signal **73** and the like; an EEPROM **65** which is an electrically rewritable non-volatile memory for storing a variety of data items such as a controlling program of the TV microcomputer **64**, communication control data, and a communication channel changing program; a remote control light receiving section **66** for receiving a control command in the form of light from a remote control device (not shown); a battery **67**; a battery charger microcomputer **68** for controlling charging/discharging of the battery **67**; and an OSD synthesizing section **69** for synthesizing an image signal outputted from the second AV selector **62** and the OSD signal **73** outputted from the TV microcomputer **64** so as to output the synthesized signal to the TV section **63**.

The TV microcomputer **64** also serves as: a control data generating section for generating later-mentioned control data; a discrimination section for discriminating a controlled device according to a discrimination code included in the control data; and a control data transmission section for transmitting the control data to the discriminated controlled device.

The SS transmission/reception unit **61** is constituted of: an SS wireless transmission/reception engine **81** constituted of an SS wireless device and wireless control section for receiving data transmitted using the SS wireless method; an MPEG2 decoder **82** for decoding a received MPEG2 stream; a D/A conversion section **83** for converting decoded data into an analog signal; and a second SS-CPU **84** (communication state detection means) for controlling each section of the SS transmission/reception unit and detecting a state of an radio wave.

The SS wireless transmission/reception engine **81** has: a receiving function for receiving an MPEG2 stream, a command or the like from the SS transmission/reception unit **36** of the wireless center unit **102**; and a transmitting function for transmitting a command or the like from the SS transmission/reception unit **61**.

Particularly, the second SS-CPU **84** has a function of radio wave state detection means for detecting a communication state (such as strength of an radio wave or hindrance to a communication route) between the wireless center unit **102** and the TV main body unit **103**, according to an electric field strength of a received radio wave and a request for re-transmission based on an error ratio. Information indicating a state of the detected radio wave is transmitted to the TV microcomputer **64** as a TV command **71**.

In the present embodiment, an arrangement is described in which the second SS-CPU **84** in the SS transmission/reception unit **61** of the TV main body unit **103** has the function of detecting the state of the radio wave. However, it may be that the first SS-CPU **54** in the SS transmission/reception unit **36** of the wireless center unit **102** has the same function and information indicating a state of a detected radio wave is transmitted as a command from the wireless center unit **102** to the TV main body unit **103**. Alternatively, it may be that both the first SS-CPU **54** and the second SS-CPU **84** have the function of detecting the state of the radio wave. Further, it may be that the TV microcomputer **64** or the wireless center microcomputer **37** has the function of detecting the state of the radio wave.

The TV microcomputer **64** controls the whole of the device, and has a function of informing means for informing, based on a detected communication state, a variety of messages such as discontinuation of image/audio data, changing of a communication channel, connecting of a communication channel, and reception quality information including being outside of communication range.

Further, the TV microcomputer **64** performs communication channel changing control in which how long a communication is discontinued is measured, and the communication channel is maintained until a predetermined time passes from a time when the communication is discontinued.

Further, the TV microcomputer **64** includes an OSD generating function section, and displays information such as a program channel, time, or volume, on a screen such as a TV. It is general that an image device such as a TV and an electronic apparatus such as a TV conference system display information such as a program channel, time, or volume on a TV screen. OSD data is maintained not in the form of an image but in a form referred to as a bit map. The OSD data in the bit map form is converted into pixel values in YUV form, which represents colors by Y, Cb, and Cr, and the converted pixels are superposed on an original image of a TV broadcast or the like. The superposing is performed in the OSD synthesizing section **69**.

Further, by connecting an image reproducing device (not shown) such a DVD to the video **4** input terminal **21**, which doubles as a TV output, it is possible to superpose an OSD display on a reproduced image on a display screen.

Further, the TV main body **3** may be arranged so as to include a speaker, a key input section, a slot and the like (these are not shown). The slot is for inserting a card-type external extension storage medium, and directly reading data by attaching a card type external extension storage medium to the slot. Examples of the card type external extension storage medium are: an SRAM (Static RAM) card which maintains written information by power source back up; a Compact Flash (CF)™ made of a flash memory and the like which does not need power source back up; a smart media; a memory stick; and a micro hard disc drive (HDD), whose size is substantially the same as a Compact Flash, or which may be attached to a PC card Type II.

Further, the remote control light receiving section **66** included in the TV main body **3** is a light communication port section using IR (Infrared Rays), and receives a light signal from a remote control device for controlling a variety of operations in the TV main body unit **103** or the wireless center unit **102**. To be specific, the remote control light receiving section **66** is an I/O port for performing light communication based on IrDA (Infrared Data Association), ASK and the like, which are standards used for transmission of data by infrared rays, or a wireless communication port performing communication by an radio wave.

Further, the battery **67** supplies a predetermined power to each section of the TV main body unit **103**. When it is possible to charge the battery **67**, the battery charger microcomputer **68** detects that, for example, the TV main body unit **103** is attached to the wireless center unit **102** or other cradle, and controls charging/discharging of a charge medium (not shown) of the battery **67** via a power supply terminal (not shown). To be specific, the battery charger microcomputer **68** stores and counts a discharged current from a battery pack, and begins charging when it judges that a remaining amount of charge in the battery pack is less than a predetermined value. In charging, the battery charger microcomputer **68** stores and counts a current charged to the battery pack, and stops charging when it judges that the battery pack is fully charged. When the TV main body **3** is separated from a commercial power source, the charged battery **67** serves as a main power source for a portable TV, and supplies power to each section of the TV main body **3**.

Next, a method is explained for transmitting/receiving control data between the wireless center **2** and the TV main body **3** in the wireless AV system **101** having the above arrangement of the present embodiment.

Here, according to an input by a user, or to an action by a predetermined program, the wireless center microcomputer **37** of the wireless center unit **102** transmits control data including a discrimination code and a control command to the SS transmission/reception unit **36**, the SS transmission/reception unit **61** of the TV main body unit **103**, or the TV microcomputer **64** of the TV main body **3**.

Here, the discrimination code is a code for discriminating which of a plurality of controlled devices the control command is for, and is generally added to a header part of control data.

The TV command **44** transmitted by the wireless center microcomputer **37** of the wireless center **2** is received by the first SS-CPU **54** of the SS transmission/reception unit **36**. When the TV command **44** is control data including a control command for the SS transmission/reception unit **36**, the first SS-CPU **54** performs a corresponding process.

When the TV command **44** transmitted by the wireless center microcomputer **37** is control data for the SS transmission/reception unit **61** or TV microcomputer **64** of the TV main body unit **103**, the first SS-CPU **54** of the SS transmission/reception unit **36** performs a predetermined coding of the data, and then transmits by wireless the coded data via the SS wireless transmission/reception engine **53**.

The SS transmission/reception unit **61** of the TV main body unit **103** receives the wireless data and discriminates control data by the second SS-CPU **84**, and when the control data is for the SS transmission/reception unit **61**, the second SS-CPU **84** performs a predetermined process.

When the received data is control data for the TV microcomputer **64**, the second SS-CPU **84** transmits the control data as the TV command **71** to the TV microcomputer **64**. As a result, the TV microcomputer **64** performs a predetermined process in the TV main body **3**.

FIGS. **4**(*a*) through **4** (*c*) schematically illustrate transmission/reception of control data (referred to as a control command hereinafter) between the wireless center unit **102** and the TV main body unit **103**.

Note that in FIGS. **4**(*a*) through **4**(*c*), a controlling device means the wireless center microcomputer **37** of the wireless center unit **102**, a wireless station **1** means the SS transmission/reception unit **36** of the wireless center unit **102**, a wireless station **2** means the SS transmission/reception unit **61** of the TV main body unit **103**, and a controlled device means the TV microcomputer **64** of the TV main body unit **103**.

FIG. **4**(*a*) illustrates a case where the controlling device transmits control data having a control command directed to the wireless station **1** (own station) in the controlling device itself. This case is referred to as a first control data transmission/reception mode. In the first control data transmission/reception mode, it is conceivable that, for example, the wireless center microcomputer **37** transmits control data having a control command for changing an MPEG transmission rate or switching a wireless channel, to the SS transmission/reception unit **36**, according to a wireless communication circumstance.

FIG. **4**(*b*) illustrates a case where the controlling device transmits control data including a control command to the wireless station **2** (other station), which is different to the controlling device. This case is referred to as a second control data transmission/reception mode. In the second control data transmission/reception mode, it is conceivable that, for example, the wireless center microcomputer **37** transmits control data including a control command for changing the MPEG transmission rate or switching the wireless channel, to the SS transmission/reception unit **61** of the TV main body unit **103**, according to a wireless communication circumstance.

FIG. **4**(*c*) illustrates a case where the controlling device transmits control data including a control command to a controlled device, which is different to the controlling device. This case is referred to as a third control data transmission/reception mode. In the third control data transmission/reception mode, it is conceivable that, for example, the wireless center microcomputer **37** transmits control data including a control command for changing an inputted channel of a program or changing a variety of settings.

Further, opposite to the cases illustrated in FIGS. **4**(*a*) through **4**(*c*), in an example where the TV microcomputer **64** of the TV main body unit **103** is a controlling device and the wireless center microcomputer **37** of the wireless center unit **102** is a controlled device, it is conceivable that a control command for changing a tuner channel or audio setting is transmitted. This example is fully explained later.

Next, a data structure of control data transmitted/received in the present embodiment is explained. The wireless AV system **101** of the present embodiment makes it easy to discriminate control data, by transmitting/receiving the control data with a predetermined key code in a header part (control command) of the control data.

FIG. **5** illustrates an example of a key code included in control data. In the example illustrated in FIG. **5**, a key code for discriminating control data is "0xFF". The key code is preset, and can be set arbitrarily. Further, when a code identical with the preset key code "0xFF" is included in a main body of the data, this code is converted according to a predetermined rule. Specifically, "0xFE" in the main body of the data is converted into "0xFE 0x00", and "0xFF" is converted into "0xFE 0x01".

With such a conversion, control data transmitted/received in the present system is easily discriminated with use of the key code "0xFF" included in the header.

Further, by converting "0xFE 0x00" into "0xFE" and "0xFE 0x01" into "0xFF" at a receiving-side of the control data, it is possible to easily restore the original control data.

FIG. **6** illustrates an example of a format of control data transmitted/received in the wireless AV system **101** of the present embodiment. As illustrated in FIG. **6**, control data is constituted of a command discrimination ID (a control command including a key code), a data size, a main body of data (control command), and a checksum.

The command discrimination ID is predetermined as an ID for discriminating the destination to which the command is transmitted. In the present embodiment, a command for the wireless station (own station) is discriminated by ID=1, a command for the wireless station (other station) is discriminated by ID=2, and a command for a controlled device sent via the other station is discriminated by ID=3. Further, a command for an external device connected to the controlled device is discriminated by ID=4.

The checksum is a value (low 1 byte) calculated by adding values of a command discrimination ID, a data size, and a main body of data, using 1 byte as a unit.

FIGS. **7**(*a*) through **7**(*d*) illustrate examples of code conversions of control commands.

FIG. **7**(*a*) illustrates an example of a conversion of the control command for the wireless station (own station) (control command for the wireless station **1**). The command discrimination ID in this case is set to 1.

FIG. **7**(*b*) illustrates an example of a conversion of the control command for the wireless station (other station) (control command for the wireless station **2**). The command discrimination ID in this case is set to 2.

FIG. **7**(*c*) illustrates an example of a conversion of the control command for the controlled device sent via the other station. The command discrimination ID in this case is set to 3.

FIG. **7**(*d*) illustrates an example of a conversion of the control command for the external device connected to the controlled device. The command discrimination ID in this case is set to 4.

In the case of any command, the data after conversion includes a key code "0xFF" in the head of the data, and "0xFE" and "0xFF" in the data before conversion are converted into "0xFE 0x00" and "0xFE 0x01" respectively, so that the key code is not misidentified.

Here, concrete examples of a variety of control commands are described below.

Examples of n own station commands (command discrimination ID=1) are,

Reception quality acquisition command: 0x01 0x00 0x01 0x01 0x03

Channel number acquisition command: 0x01 0x00 0x01 0x02 0x04

Examples of other-station commands (command discrimination ID=2) are,

Channel changing command: 0x02 0x0 00x01 0x01 0x04

Name of other-station device acquisition command: 0x02 0x00 0x01 0x02 0x05

Examples of commands for a device connected to the other-station (command discrimination ID=3) are,

Reproduction command: 0x03 0x00 0x02 0x00 0x01 0x06

Stop command: 0x03 0x00 0x02 0x00 0x02 0x07

Fast forward command: 0x03 0x00 0x02 0x00 0x03 0x08

Rewinding command: 0x03 0x00 0x02 0x00 0x04

In the examples illustrated in FIGS. **4**(*a*) through **4**(*c*), the controlling device is the wireless center microcomputer **37** of the wireless center unit **102**, and the controlled device is the TV microcomputer **64** of the TV main body unit **103**. On the other hand, it may be that the controlling device is the TV main body unit **103** and the controlled device is the wireless center unit **102**. An example of this case is explained below, with respect to each purpose of each control command, with reference to FIGS. **8**(*a*) and **8**(*b*) through FIGS. **11**(*a*) and (*b*).

Here, it is assumed that the controlling device is the TV microcomputer **64** of the TV main body unit **103**, and that the wireless station **1** is the SS transmission/reception unit **61** of the TV main body unit **103**. Further, it is assumed that the wireless station **2** is the SS transmission/reception unit **36** of the wireless center unit **102**, and that the controlled device is the wireless center microcomputer **37** of the wireless center unit **102**. It is assumed that the external device is an AV device (not shown) connected to the wireless center unit **102**, such as a DVD recorder.

When acquisition of transmitted radio wave strength in the wireless station **1** is intended, the controlling device transmits control data to the wireless station **1**, as illustrated in FIG. **8**(*a*). In this case, the command discrimination ID=1, and the control data has a data structure illustrated in FIG. **8**(*b*). Here, as illustrated in FIG. **7**(*a*), the control command included in the control data is converted by the TV microcomputer **64**, acting as the controlling device, of the TV main body unit **103**.

Note that the control data illustrated in FIG. **8**(*b*) includes a 1 byte control command (a control command after conversion, illustrated in FIG. **7**(*a*)) corresponding to the command discrimination ID=1, 2 bytes of size data for indicating a size of a main body of the control data, 1 byte of data showing a main body of the data (a command number indicating acquisition of transmitted radio wave strength), and 1 byte of data (CRC) indicating a checksum.

When acquisition of received radio wave strength in the wireless station **1** is intended, the controlling device transmits a control command to the wireless station **2** via the wireless station **1**. In this case, the command discrimination ID=2, and the control data has a data structure illustrated in FIG. **9**(*b*). Here, as illustrated in FIG. **7**(*b*), the control command included in the control data is converted by the TV microcomputer **64**, acting as the controlling device, of the TV main body unit **103**.

Note that the control data illustrated in FIG. **9**(*b*) includes a 1 byte control command (a control command after conversion, illustrated in FIG. **7**(*b*)) corresponding to the command discrimination ID, 2 bytes of size data for indicating a size of the control data, 1 byte of data indicating a main body of the

data (a command number indicating acquisition of a received radio wave strength), and 1 byte of data (CRC) indicating a checksum.

When switching of an external input in the controlled device is intended, the controlling device transmits a control command to the controlled device via the wireless stations **1** and **2**, as illustrated in FIG. **10**(*a*). In this case, the command discrimination ID=3, and the control data has a data structure illustrated in FIG. **10**(*b*). Here, as illustrated in FIG. **7**(*c*), the control command included in the control data is converted by the TV microcomputer **64**, acting as the controlling device, of the TV main body unit **103**.

Note that the control data illustrated in FIG. **10**(*b*) includes 1 byte of data corresponding to the command discrimination ID, 2 bytes of size data indicating a size of the control data, 1 byte of data indicating a main body of the data (a command number corresponding to input switching), data corresponding to a parameter indicating an external input **1**, 1 byte of data (CRC) indicating a checksum.

When direct remote control of an external device via the controlled device is intended, the controlling device transmits a control command to the external device via the wireless stations **1** and **2** and the controlled device. In this case, the command discrimination ID=4, and the control data has a data structure illustrated in FIG. **11**(*b*). Here, as illustrated in FIG. **7**(*d*), the control command included in the control data is converted by the TV microcomputer **64**, acting as the controlling device, of the TV main body unit **103**.

Note that the control data illustrated in FIG. **11**(*b*) includes 1 byte of data corresponding to the command discrimination ID, 2 bytes of data indicating a size of the control data (here, a main body of the data is 80 bytes), data indicating a main body of the data (a command number corresponding to a remote-control-issued function), data corresponding to a parameter indicating an IrDA sampling data message, and 1 byte of data (CRC) indicating a checksum.

As a concrete example of control command transmission, as illustrated in FIGS. **11**(*a*) and **11**(*b*), for example, the wireless AV system **101** illustrated in FIG. **12** is considered. Here, in the wireless AV system **101** illustrated in FIG. **12**, it is possible to operate, using the remote controller **130**, an external device such as a DVD player or a video deck connected to the wireless center unit **102**, via the TV main body unit **103**.

As an application of such a remote control operation, a system illustrated in FIG. **13** is conceivable. In FIG. **13**, three TV main body units **103***a* through **103***c* transmit control data to one wireless center unit **102**, and perform remote control of external devices (devices A through C) connected to the wireless center unit **102**. Namely, the wireless center unit **102** transmits control data received from the TV main body unit **103** to remote control light receiving sections (**110***a* through **110***c*) of the remotely controlled devices.

In this case, the control data is generated on the TV main body unit **103** side, transmitted from the TV main body unit **103** to the wireless center unit **102**, and transmitted from the wireless center unit **102** to each of the external devices. A process for distributing the control data to the external devices is performed in the wireless center microcomputer **37** of the wireless center unit **102**.

The wireless AV system **101** to which the wireless control system of the present invention is applied is explained above, with reference to concrete embodiments. However, the present invention is not limited to the embodiments. It is possible for a person with ordinary skill in the art to which the invention pertains, to perform a variety of changes or modifications to arrangements and functions of the invention according to each of the embodiments or other embodiments, within the scope of the present invention.

For example, in the present embodiment, as a wireless AV device, a portable TV is exemplified. However, the present invention is not limited to a TV receiver, and is applicable to a device having a wireless communication function or to a device into which a wireless communication function is merged. For example, the AV device may be a VTR (Video Tape Recorder), or record reproducing device which stores a record in a HDD or DVD. Further, a device for transmission/reception of data may be a device in which a function for transmission/reception of data is merged with an information device function represented by a personal computer, and applicable to all the systems. Further, contents of transmitted/received data may be anything.

Further, in the present embodiment, the TV receiver is exemplified, but the present invention is not limited to this, and is applicable to a personal computer with a tuner, or to other AV devices using a tuner.

Further, kinds of each section constituting the wireless communication device and the wireless AV system, and kinds/styles of setting information or the like are not limited to the embodiments. Particularly, the present invention may be preferably applied to a device based on HAVi.

Further, as a tuner, two broadcasting tuners such as a BS tuner and a U/V tuner are exemplified, but kinds and numbers of broadcasting tuners are not limited to this. For example, a CS tuner may be used.

Further, in the present embodiment, names such as a wireless communication device and a wireless AV system are used, but these names are used for convenience of explanation, and they may be a wireless communication apparatus, an AV device, a broadcasting selecting device, or the like.

The wireless communication device and the wireless AV system as described above can be realized by a program for causing the wireless communication device and the wireless AV system to function. The program may be stored in a storage medium readable by a computer. In the present invention, the storage medium may be program media being a main memory itself, or program media readable by inserting a storage medium into a program reading device provided as an external storage device.

In either case, the stored program may be arranged so as to be carried out by access by a CPU. Alternatively, in either case, the program may be arranged so as to be read out, downloaded to a program storage area (not shown) and carried out. A program for downloading is stored in a main body of the device beforehand.

Here, the program media may be arranged so as to be a storage medium detachable from the main body, and be a medium permanently storing a program. For example, tapes such as a magnetic tape and a cassette tape, discs such as a magnetic disc (e.g. Floppy™ disc or a hard disc) or an optical disc (e.g. CD-ROM, MO, MD, or DVD), cards such as an IC card or an optical card, and semiconductor memories such as a mask ROM, EPROM, EEPROM, or flash ROM.

Further, when means (not shown) for connecting with an external communication network is provided, the program media may be arranged so as to be a medium for temporarily storing a program so as to download the program from a communication network via means for connecting with an external communication network.

Note that when a program is downloaded from the communication network in this way, a program for downloading may be stored in the main body of the device beforehand, or

may be installed from other storage media. Contents to be stored in the storage media are not limited to programs, and may be data.

Further, at present, new terrestrial digital broadcasting has been prepared, which will take the place of analog terrestrial broadcasting viewed across the country. The terrestrial digital broadcasting started in 2003 in three urban areas: Kanto, Kinki, and Tokai, and will spread across the country in 2006. Along with this spreading, current analog broadcasting will be abolished in 2011.

ISDB (Integrated Services Digital Broadcasting) is a concept of the next generation of integrated digital broadcasting that treats all information such as images, audio, and data items, as digital data items. As a concrete service of ISDB, digital TV broadcasting, digital audio broadcasting, facsimile broadcasting, multimedia broadcasting and the like are studied. As a transmission channel for ISDB, a satellite broadcast wave, a terrestrial broadcast wave, and a wired transmission channel such as a co-axial cable or an optical fiber are now considered.

Technical standard ISDB-T (Terrestrial) of the terrestrial digital broadcasting adopts OFDM (Orthogonal Frequency Division Multiplexing) that uses a number of carriers as a modulation method, and thereby allows reduction of ghosting caused by a plurality of transmission routes (multiple-paths) such as reflection from buildings. Further, ISDB-T defines a plurality of transmission modes, which define a carrier interval, a plurality of modulation methods with respect to each carrier, and a plurality of guard intervals in temporal axis directions provided with respect to each effective symbol length, and accordingly a large number of signal methods are allowed as standard. In practice, out of these methods, an optimal method is selected according to a service, such as fixed reception or mobile reception.

Further, in ISDB-T, one transmission channel (band is approximately 5.6 MHz) is divided into 13 segments (1 segment=approximately 430 kHz), and the modulation method is changed using this segment as a unit. As a result, a broadcasting station can determine a signal arrangement arbitrarily, such as audio broadcasting and high definition broadcasting in one channel, and standard fixed broadcasting and mobile broadcasting in another channel.

Further, ISDB-T adopts an interleave in a temporal direction, and a radio wave used for ISDB-T is suitable for transmission to a movable body. As such, ISDB-T allows stabilized reception even by a receiving device on a movable body, such as an in-vehicle TV, and a portable terminal such as a PDA (Personal Digital Assistant) or a mobile phone. In future, a service assuming such mobile reception is greatly expected.

Therefore, the wireless control system of the present invention can be preferably used for such services.

Further, the present invention may be arranged as follows.

The device according to the present invention may be arranged to be a device for transmitting/receiving control data among AV devices constituting the wireless AV system, including: means for generating control data; means for converting the generated control data; means for transmitting/receiving by wireless the converted control data; and means for discriminating the converted control data and acquiring the data before conversion.

Further, the means for converting the control data may be arranged so that the means adds a key code for discriminating the control data to a head part of the control data, and when data whose content is identical with the key code exists in another part of the control data, the means performs a predetermined conversion of the data.

Further, the control data may include: data by which the AV device constituting the wireless AV system controls a wireless communication station in the AV device itself; data by which the AV device controls a wireless communication station in an AV device other than the AV device itself; and data by which the AV device controls the AV device other than the AV device itself.

Further, the control data may include a command for changing a data transmission rate, changing a wireless communication channel, changing a tuner channel, and switching an input.

As described above, with the wireless AV system of the present invention, when transmission/reception of control data among the AV devices is performed, it is possible to discriminate control data according to a key code added to a header, without processing a main body of the data. As a result, it is possible to reduce the burden of data discrimination in a wireless station and a terminal.

The present invention is not limited to the embodiments, and a variety of modifications are possible within the scope of the following claims. That is, embodiments obtained by combining technical means suitably modified within the scope of the following claims are also within the technical scope of the present invention.

Each section of the wireless AV system **101** of the embodiments can be realized in such a manner that calculation means such as a CPU performs a program stored in storage means such as a ROM (Read Only Memory) or RAM, and controls input means such as a keyboard, output means such as a display, or communication means such as an interface circuit. Therefore, a computer having such means reads a storage medium for storing the program and carries out the program, and thereby a variety of functions and a variety of processes of the wireless AV system **101** of the present embodiment can be realized. Further, by storing the program in a removable storage medium, it is possible to realize a variety of the functions and a variety of the processes in an arbitrary computer.

The storage medium may be program media being a memory (not shown), such as a ROM, so as to be processed by a microcomputer, or program media readable by inserting a storage medium to a program reading device (not shown) provided as an external storage device.

In either case, it is preferable that the stored program is carried out by an access by a microprocessor. Further, it is preferable that the program is read out, downloaded to a program storage area of the microcomputer and carried out. A program for downloading is stored in the main body of the device beforehand.

Further, the program medium is a storage medium detachable from the main body, and permanently storing a program. For example, tapes such as a magnetic tape and a cassette tape, discs such as a magnetic disc (e.g. a flexible disc or a hard disc) or an optical disc (e.g. CD, MO, MD, or DVD), cards such as an IC card (including a memory card), and semiconductor memories such as a masked ROM, EPROM (Erasable Programmable Read Only Memory), EEPROM (Electrically Erasable Programmable Read Only Memory), or flash ROM.

Further, when it is possible to connect the system with a communication network including the Internet, it is preferable that the program media is a medium for temporarily storing a program so as to download the program from the communication network.

Further, when a program is downloaded from the communication network in this way, it is preferable that a program for downloading is stored in the main body of the device beforehand, or installed from other storage media.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

INDUSTRIAL APPLICABILITY

The wireless system of the present invention is preferably used for a home AV network system (e.g. a wireless TV receiver having a separable display) that transmits image and/or audio data by wireless. However, the wireless system of the present invention is not limited to this, and is widely applicable for a wireless communication device such as a mobile phone/PHS (Personal Handy-Phone System)™ or a portable information terminal (PDA (Personal Digital Assistant)).

The invention claimed is:

1. A wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

wherein the controlling device wirelessly generates and transmits control data to the controlled devices, the control data including (i) a control command and (ii) a discrimination code for discriminating which of the controlled devices in the system the control command is for, and

the controlled devices receive the wirelessly transmitted control data from the controlling device, read out the discrimination code included in the control data, and discriminating which of the a controlled device in the system the control command is for, the control data being transmitted to a controlled device discriminated by the discrimination section,

wherein the control command includes one of a first command, a second command, and a third command,

the first command includes a reception quality acquisition command and a channel number acquisition command,

the second command includes a channel changing command and a name of other-station device acquisition command, and

the third command includes a reproduction command, a stop command, a fast forward command, and a rewinding command, wherein

the first command is control data transmitted to a first controlled device by the controlling device;

the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and

the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device.

2. A wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

wherein the controlling device includes:

a control data generating section for generating control data including (i) a control command and (ii) a discrimination code for discriminating which of the controlled devices in the system the control command is for; and

a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication, and

wherein each of the controlled devices includes:

a wireless communication section for receiving the control data from the controlling device;

a discrimination section for reading out the discrimination code included in the received control data, and discriminating which of the controlled devices the control command included in the control data is for; and

a control data transmission section for transmitting the control data to a controlled device discriminated by the discrimination section,

wherein, when generated control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

3. The wireless control system as set forth in claim 2, wherein control data generated in the control data generating section is any one of control data to be transmitted to a control section included in the controlling device, control data to be transmitted to the wireless communication section in the controlling device, control data to be transmitted to a control section included in the controlled devices, and control data to be transmitted to the wireless communication section in the controlled devices.

4. The wireless control system as set forth in claim 2, wherein the wireless communication section transmits control data using a spread spectrum wireless system.

5. The wireless control system as set forth in claim 2, wherein the wireless communication section performs low power, close range, two-way wireless communication such as a wireless LAN, Bluetooth or UWB (Ultra Wide Band).

6. The wireless control system according to claim 2, wherein, when the predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.

7. A wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

wherein the controlling device includes:

a control data generating section for generating control data including (i) a control command and (ii) a discrimination code for discriminating which of the controlled devices in the system the control command is for; and

a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication, and

wherein each of the controlled devices includes:

a wireless communication section for receiving the control data from the controlling device;

a discrimination section for reading out the discrimination code included in the received control data, and discriminating which of the controlled devices the control command included in the control data is for; and

a control data transmission section for transmitting the control data to a controlled device discriminated by the discrimination section,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when generated control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the

same data, and transmits the converted control data to the wireless communication section.

8. Controlled devices, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlled devices (i) receiving control data which includes a discrimination code for discriminating between the controlled devices in the system, and (ii) discriminating a controlled device to carry out a control command included in the control data, based on the discrimination code included in the received control data,

wherein the control command includes one of a first command, a second command, and a third command,

the first command includes a reception quality acquisition command and a channel number acquisition command,

the second command includes a channel changing command and a name of other-station device acquisition command, and

the third command includes a reproduction command, a stop command, a fast forward command, and a rewinding command, wherein

the first command is control data transmitted to a first controlled device by the controlling device;

the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and

the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device.

9. The wireless control system according to claim 8, wherein, when a predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.

10. Controlled devices, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlled devices including:

a wireless communication section for receiving from the controlling device control data including a discrimination code for discriminating between the controlled devices in the system;

a discrimination section for reading out the discrimination code included in the received control data and discriminating a controlled device to carry out a control command included in the control data; and

a control data transmission section for transmitting the control data to the controlled device discriminated by the discrimination section,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

11. A controlling device, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlling device wirelessly transmitting control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

12. A controlling device, included in a wireless control system comprising a controlling device and controlled devices that are wirelessly controlled by the controlling device,

said controlling device including:

a control data generating section for generating control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system; and

a wireless communication section for transmitting the control data transmitted from the control data generating section, to a controlled device with which the wireless communication section is in communication,

wherein, when generated control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

13. The wireless control system according to claim 12, wherein, when the predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.

14. A method of controlling devices, in which a controlling device wirelessly controls controlled devices,

wherein the controlling device wirelessly transmits control data to the controlled devices, the control data having, in a control command for controlling the controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in the system, and

the controlled devices receive the control data wirelessly transmitted from the controlling device, and, based on the discrimination code included in the received control data, discriminate a controlled device to carry out the control command included in the control data, and transmit the control data to the discriminated controlled device,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication chan-

nel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, the control data generating section performs a predetermined conversion of the same data, and transmits the converted control data to the wireless communication section.

15. The method of controlling devices according to claim **14**, wherein, when the predetermined key code for discriminating the control data is provided in header of the control data, and data body of the control data includes same data as the predetermined key code, the controlling devices performs a predetermined conversion of the same data, and transmits the converted control data to the controlled devices.

16. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

receiving control data which includes a discrimination code for discriminating between controlled devices in a system, and (ii) discriminating a controlled device to carry out a control command included in the control data, based on the discrimination code included in the received control data,

wherein the control command includes one of a first command, a second command, and a third command,

the first command includes a reception quality acquisition command and a channel number acquisition command,

the second command includes a channel changing command and a name of other-station device acquisition command, and

the third command includes a reproduction command, a stop command, a fast forward command, and a rewinding command, wherein

the first command is control data transmitted to a first controlled device by the controlling device;

the second command is control data transmitted to a second controlled device by the controlling device via the first controlled device; and

the third command is control data transmitted to a third controlled device by the controlling device via the first controlled device and via the second controlled device.

17. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

receiving control data including a discrimination code for discriminating between controlled devices in a system;

reading out the discrimination code included in the received control data and discriminating a controlled device to carry out a control command included in the control data; and

transmitting the control data to the controlled device discriminated,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, a predetermined conversion of the same data is preformed, and the converted control data is transmitted.

18. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

transmitting control data to controlled devices, the control data having, in a control command for controlling a controlled devices, a discrimination code for discriminating between the controlled device to which the control command is to be transmitted and other one or more controlled devices in a system,

wherein the control data includes, as a control command, a command for performing a change of a data transmission rate, a change of a wireless communication channel, a change of a tuner channel, switching of an input, and acquisition of a communication state, and

wherein, when the control data includes same data as a predetermined key code, a predetermined conversion of the same data is preformed, and the converted control data is transmitted.

19. A machine-readable medium having instructions stored thereon, said instructions are read and executed by a processor for causing the processor to perform a method of discriminating between controlled devices, comprising:

generating control data having, in a control command for controlling controlled devices, a discrimination code for discriminating between a controlled device to which the control command is to be transmitted and other one or more controlled devices in a system; and

transmitting the control data to a controlled device,

wherein, when generated control data includes same data as a predetermined key code, performing a predetermined conversion of the same data and transmitting the converted control data.

* * * * *

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	1

Complete if Known	
Application Number	Not Yet Assigned
Filing Date	10-14-05
First Named Inventor	Kenji Sakamoto
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	1248-0819PUS1

U.S. PATENT DOCUMENTS

Examiner initial *	Cite No. [1]	Document Number Number - Kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initial *	Cite No. 1	Foreign Patent Document Country [3] Code	Number [4] Kind Code (if known) [5]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear	T [6]
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Japanese Patent Application Publication
Tokukaihei No. 2-226898 A (1990)

The following is a partial English translation of exemplary portions of non-English language information that may be relevant to the issue of patentability of the claims of the present application.

An operation code outputted from the remote controller which code is for the television receiver 1 has a different header from that of an operation code for the VTR 2. The microprocessors 10 and 11 include a function for identifying whether or not the operation code is for its own device, based on the header. The operation codes of the television receiver 1 and the VTR 2 are both inputted from the light receiving element 8 of the television receiver 1; the microprocessor 10 first identifies based on the header whether or not the inputted operation code is for the television receiver 1. When the operation code is for the television receiver 1, the microprocessor 10 causes the television receiver 1 to operate in accordance with the operation code. However, if the operation code is not for the television receiver 1, the microprocessor 10 sends this operation code to the microprocessor 11 of the VTR 2 via the system cable 3. The microprocessor 11 then identifies based on the header that the operation code is for the VTR 2, and causes operation of the VTR 2 in accordance with the operation code.

The microprocessor 11 includes a program that (i) identifies the operation code and (ii) operates the VTR 2 in accordance with the operation code. Furthermore, this program also has a function to generate an operation code for the television receiver 1, which is required for causing the television receiver 1 to link with the VTR 2. The operation code for linking

the television receiver 1 with the VTR 2 is inputted from the light receiving element 8 as a code for the VTR 2, and once the microprocessor 11 receives this operation code, not only does the microprocessor 11 cause the VTR 2 to operate in accordance with the operation code, but also the microprocessor 11 simultaneously generates the operation code for the television receiver 1 and sends this to the microprocessor 10 via the system cable 3. The microprocessor 10 identifies this operation code, and causes the television receiver 1 to operate in accordance with the operation code.

⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　平2−226898

⑤Int. Cl.'		識別記号	庁内整理番号
H 04 Q	9/00	301 E	6945−5K
H 04 B	1/034	C	8020−5K
H 04 N	5/00	A	6940−5C

⑬公開　平成2年(1990)9月10日

審査請求　未請求　請求項の数 7　(全7頁)

⑭発明の名称　AVコントロールシステム

⑳特　願　平1−45296
㉒出　願　平1(1989)2月28日

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明　細　書

1．発明の名称

AVコントロールシステム

2．特許請求の範囲

1．AV機器間を双方向通信を可能にシステムケーブルで接続し、該AV機器夫々の電源のオン／オフを含む各種操作のための操作コードの入力手段を1つの特定の該AV機器の操作コード入力手段とし、かつ所望の該AV機器での所定の該操作コードの受信とともに該所望のAV機器からこれに連動すべき他の所望の該AV機器に該システムケーブルを介して連動させるに必要な該操作コードを送信し、該AV機器夫々の電源オン／オフを含む各種操作を可能に構成したことを特徴とするAV（コントロール）システム~~コントローラ~~。

2．請求項1において、前記操作コードはリモートコントロールユニットから出力され、かつ前記AV機器毎に前記操作コードのヘッダーが異なることを特徴とするAV（コントロール）システム~~コントローラ~~。

3．請求項2において、前記AV機器は、夫々前記ヘッダーによって自己の前記操作コードを識別し、該自己の操作コードに応じて他の前記AV機器の操作コードを前記システムケーブルを介して出力可能としたことを特徴とするAV（コントロール）システム~~コントローラ~~。

4．請求項1，2または3において、前記システムケーブルは取りはずし可能であって、前記AV機器は夫々、前記システムケーブルが取りはずされているとき、単独に操作可能であることを特徴とするAVコントロールシステム。

5．請求項1，2，3または4において、前記特定のAV機器はテレビジョン受像機であって、他の前記AV機器の1つはビデオテープレコーダであることを特徴とするAVコントロールシステム。

6．請求項5において、前記ビデオテープレコーダの電源をオンする前記操作コードの入力により、前記ビデオテープレコーダとともに前記テレビジョン受像機が電源オンすることを特徴と

するＡＶコントロールシステム。

7．請求項5において、前記ビデオテープレコーダのタイマによる電源のオン，オフに連動して前記テレビジョン受像機の電源がオン，オフすることを特徴とするＡＶコントロールシステム。

3．発明の詳細な説明

［産業上の利用分野］

本発明は、テレビジョン受像機、ＶＴＲ、衛星放送受信チューナ（ＢＳチューナ）を含むＡＶ機器に用いて好適なＡＶコントロールシステムに関する。

［従来の技術］

従来、テレビジョン受像機、ＶＴＲなどの機器にはリモートコントロールユニット（以下、リモコンという）が付属しており、電源のオン／オフも含む各種動作をリモコンを操作することによつて選択的に行なわせることができる。これにより、機器を、それ自体に設けられている操作部を操作することなく、これから離れた位置から操作することができて便利になつている。

［発明が解決しようとする課題］

しかしながら、これら従来の機器においては、夫々が個々に操作されなければ動作しないように構成されているために、複数の機器を動作させて使用する場合、これら機器毎に操作しなければならず、操作が煩雑となつて手間がかかるという問題があつた。

たとえば、ＶＴＲの再生画をテレビジョン受像機で表示する場合をみると、夫々を動作させるためには夫々に対して操作することが必要であるから、

（1）テレビジョン受像機の電源をオンする。

（2）ＶＴＲの電源をオンする。

（3）テレビジョン受像機の入力切替をする。

（4）ＶＴＲを再生モードにする。

の一連の操作が最低必要となる。

テレビジョン受像機とＶＴＲとを単一のリモコンによつて操作することができるようにしたＡＶコントロールシステムも開発されているが、これも電源のオン／オフは夫々の機器毎に操作しなければならず、テレビジョン受像機とＶＴＲとがともに電源オンしたとき、テレビジョン受像機の入力切替がＶＴＲ側になるだけである。

本発明の目的は、かかる問題点を解消し、各種ＡＶ機器からなるシステムでの各機器の操作を簡略化し、使い勝手が大幅に向上したＡＶコントロールシステムを提供することにある。

［課題を解決するための手段］

上記目的を達成するために、本発明は、複数のＡＶ機器間を双方向通信を可能にシステムケーブルで接続し、各ＡＶ機器の電源のオン／オフを含む各種操作のための操作コードを１つの特定の該ＡＶ機器から入力し、かつ該操作コードによる所望の該ＡＶ機器の電源オンとともに、該所望のＡＶ機器からこれに連動すべき他の所望のＡＶ機器に該システムケーブルを介して電源をオンするための操作コードを送信するように構成する。

［作用］

特定のＡＶ機器から入力された操作コードを解読した所望のＡＶ機器は、この操作コードに応じた動作を開始するが、ＶＴＲとテレビジョン受像機のように連動すべき複数のＡＶ機器に対しては、所望のＡＶ機器が操作コードによつて電源オンすると、これからシステムケーブルを介して連動すべき他の所望のＡＶ機器に電源をオンすべき操作コードを送る。これによつて、所望のＡＶ機器に対する電源オンの操作のみで、これに連動すべき他のＡＶ機器の全てが電源オンとなる。

［実施例］

以下、本発明の実施例を図面によつて説明する。

第１図～第３図は本発明によるＡＶコントロールシステムの一実施例を示すものであつて、第１図は全体構成図、第２図は操作コードの入力部の一具体例を示す図、第３図は操作コードの通信系を示す図であり、１はテレビジョン受像機、２はＶＴＲ、３はシステムケーブル、４はビデオ伝送線、５はオーディオ伝送線、６はアンテナ、７は受光部、８，９は受光素子、１０，１１はマイクロプロセサである。

第１図において、従来のように、夫々個々に操

作が可能なテレビジョン受像機１とＶＴＲ２とはビデオ伝送線４とオーディオ伝送線５とで接続されており、ＶＴＲ２の録画モードでは、アンテナ６で受信された番組が録画される。再生モードでは、再生される番組のビデオ信号がビデオ伝送線４を介し、オーディオ信号がオーディオ伝送線５を介して夫々テレビジョン受像機１に伝送され、再生される番組の画像が表示されて音声が出力される。

この実施例では、さらに、テレビジョン受像機１，ＶＴＲ２間がシステムケーブル３で接続可能となっている。これら間がシステムケーブル３で接続されていないときには、従来と同様、これらテレビジョン受像機１とＶＴＲ２とはリモコンによって個々に操作されなければならないが、これら間がシステムケーブル３で接続されたときには、これらテレビジョン受像機１とＶＴＲ２とをリモコンで操作する場合、そのための操作コードがテレビジョン受像機１側から入力され、ＶＴＲ２の操作のための操作コードはテレビジョン受像機１からシステムケーブル３を介してＶＴＲ２に供給される。

第２図に示すように、テレビジョン受像機１の前面には受光部７が設けられ、リモコンが発生する操作コードで変調された赤外線がこの受光部７で受光されることにより、操作コードがテレビジョン受像機１から入力される。勿論ＶＴＲ２にも同様の受光部が設けられているが（図示せず）、テレビジョン受像機１とＶＴＲ２とがシステムケーブルで接続されているときには、ＶＴＲ２のこの受光部からの操作コードの入力は禁止される。

但し、テレビジョン受像機１とＶＴＲ２は、システムケーブル３で接続されていても、夫々に設けられた操作部により、夫々単独に操作することができる。

次に、第３図において、テレビジョン受像機１にはそれを動作させるためのマイクロプロセサ10が、また、ＶＴＲ２にはそれを動作させるためのマイクロプロセサ１１が夫々設けられている。マイクロプロセサ１０は、テレビジョン受像機１の受光部７（第２図）における受光素子８がリモコンからの赤外線を受光することによって受信された操作コードやテレビジョン受像機１の操作部によって入力される操作コードを取り込み、このテレビジョン受像機１にこの取り込んだ操作コードに応じた動作を行なわせる。ＶＴＲ２のマイクロプロセサ１１も同様であり、受光素子９からリモコンからの赤外線を受光することによって入力される操作コードやＶＴＲ２の操作部によって入力される操作コードを取り込み、ＶＴＲ２にこの取り込んだ操作コードに応じた動作を行なわせる。

システムケーブル３はこれらマイクロプロセサ１０，１１間を接続し、これら間で操作コードの双方向通信を可能とする。また、システムケーブル３が接続されると、ＶＴＲ２のマイクロプロセサ１１は受光素子９による操作コードの入力を禁止する。

一方、リモコンから出力される操作コードは、テレビジョン受像機１に対するものとＶＴＲ２に対するものとでヘッダーを異にしており、マイクロプロセサ１０，１１は夫々このヘッダーでもって自己に対する操作コードであるか否かを識別する機能を有している。そこで、テレビジョン受像機１とＶＴＲ２との操作コードはいずれもテレビジョン受像機１の受光素子８から入力されるが、まず、マイクロプロセサ１０で入力された操作コードがテレビジョン受像機１に対するものか否かをそのヘッダーによって識別される。この操作コードがテレビジョン受像機１に対するものであるときには、マイクロプロセサ１０はテレビジョン受像機１をこの操作コードに応じて動作させるが、この操作コードがテレビジョン受像機１に対するものでないとき、マイクロプロセサ１０はこの操作コードをシステムケーブル３を介してＶＴＲ２のマイクロプロセサ１１に送る。そこで、このマイクロプロセサ１１は、この送られてきた操作コードがＶＴＲ２に対するものであることをそのヘッダーによって識別し、ＶＴＲ２をこの操作コードに応じて動作させる。

マイクロプロセサ１１は、操作コードの識別や

ＶＴＲ２を操作コードに応じて動作させるプログラムを有しているが、このプログラムにより、テレビジョン受像機１をＶＴＲ２と連動させるに必要なテレビジョン受像機１に対する操作コードの発生機能も有している。テレビジョン受像機１とＶＴＲ２を連動させるための操作コードはＶＴＲ２に対するものとして受光素子８から入力されるが、マイクロプロセサ１１は、この操作コードを取り込むと、この操作コードに応じてＶＴＲ２を動作させるが、これと同時に、テレビジョン受像機１に対する操作コードを作成し、システムケーブル３を介してマイクロプロセサ１０に送る。マイクロプロセサ１０はこの操作コードを識別し、この操作コードに応じてテレビジョン受像機１を動作させる。

そこで、テレビジョン受像機１とＶＴＲ２とが電源オフの状態でＶＴＲ２の電源をオンする操作をリモコンで行なうと、このための操作コードが受光素子８からマイクロプロセサ１０、システムケーブル３を介してマイクロプロセサ１１に供給され、ＶＴＲ２が電源オンされる。これとともに、マイクロプロセサ１１はテレビジョン受像機１を電源オンする操作コードとテレビジョン受像機１の入力をＶＴＲ２側に切換える操作コードとを作成し、システムケーブル３を介してマイクロプロセサ10に送る。これにより、テレビジョン受像機１は電源オンされ、さらに、ＶＴＲ２側への入力切替えが行なわれて、ＶＴＲ２のアンテナ６（第１図）で受信される番組が表示される。その後、リモコンで録画操作が行なわれると、これによる操作コードがテレビジョン受像機１、システムケーブル３を介してマイクロプロセサ１１に供給され、ＶＴＲ２でアンテナ６による受信番組の録画が行なわれるし、また、リモコンで再生操作が行なわれると、同様にして、ＶＴＲ２で再生が行なわれて再生番組がテレビジョン受像機１で表示される。巻戻しや早送りなどの各モード設定のための操作コードや、ＶＴＲ２のチユーナでのチユーニングのための操作コードなど各種内容の操作コードもテレビジョン受像機１を介してＶＴＲ２に送られる。

このようにして、リモコンからの操作コードによつてテレビジョン受像機１やＶＴＲ２の動作状態が切換えられるが、ＶＴＲ２にオフタイマ（設定された時刻での自動再生終了機能）のセツトに対しても、マイクロプロセサ１１はテレビジョン受像機１を電源オンさせる操作コードも作成する。これにより、ＶＴＲ２にオフタイマがセツトされていると、内蔵のタイマによつてＶＴＲ２がオフする時刻が検出されたとき、マイクロプロセサ11は、ＶＴＲ２を停止モードとして電源をオフするとともに、テレビジョン受像機１を電源オフする操作コードを作成し、システムケーブル３を介してマイクロプロセサ１０に送る。これにより、テレビジョン受像機１は電源オフする。

なお、ＶＴＲ２を電源オンしただけではテレビジョン受像機１は電源オンせず、ＶＴＲ２が録画モードや各種再生モードに設定されたとき、テレビジョン受像機１が電源オンされて入力がＶＴＲ２側に切替えられるようにしてもよい。但し、テレビジョン受像機１では、リモコンによる電源のオン，オフを単独に行なえることは、マイクロプロセサ１０の操作コードによる上記動作から明らかである。また、上記の説明から明らかなように、テレビジョン受像機１が電源オンしているか否かにかかわらず、リモコンからの操作コードによつてＶＴＲ２が電源オンすると、テレビジョン受像機１はＶＴＲ２側への入力切替えが行なわれる。

マイクロプロセサ１１は、マイクロプロセサ10からの操作コードを取り込むと、その旨の応答信号をマイクロプロセサ１０に送り、また、マイクロプロセサ１０は、マイクロプロセサ１１からの操作コードを取り込むと、その旨の応答信号をマイクロプロセサ１１に送る。これらマイクロプロセサ１０，１１は、応答信号がないときには繰り返し操作コードを送るが、この繰り返し回数は操作コードの内容に応じて異なり、この規定する回数だけ繰り返し操作コードを送つても応答信号がないときには、この操作コードの送信を中止する。

そこで、テレビジョン受像機１とＶＴＲ２とが

システムケーブル３で接続されていないとき、試つてリモコンからのテレビジョン受像機１に対する操作コードをＶＴＲ２の受光素子９から入力したとすると、このときにはマイクロプロセサ１１は受光素子９から入力される操作コードを取り込むので、マイクロプロセサ１１は取り込んだ操作コードがテレビジョン受像機１に対するものと識別してシステムケーブル３の接続端子に出力する。しかし、システムケーブル３が接続されていないために、この操作コードを取り込んだという応答信号がなく、マイクロプロセサ１１は繰り返し同一操作コードを出力する。規定回数操作コードを出力しても応答信号がないと、マイクロプロセサ１１はシステムケーブル３でテレビジョン受像機１が接続されていないと判定し、この操作コードの出力を停止する。

第４図は本発明によるＡＶコントロールシステムの他の実施例を示すブロック図であつて、１２はＡＶコントロールアンプ、１３はＶＴＲ、１４はテレビジョン受像機、１５はＢＳチユーナであり、１３，１４，１５は夫々システムケーブル３ａ，３ｂ，３ｃによつてＡＶコントロールアンプ１２に接続されている。これらＶＴＲ１３，テレビジョン受像機１４，ＢＳチユーナ１５は、夫々第３図で説明したようなマイクロプロセサやリモコンからの赤外光の受光部を備えている。

図示するようにシステムケーブル３ａ，３ｂ，３ｃが接続されているときには、先の実施例と同様に、ＶＴＲ１３，テレビジョン受像機１４，ＢＳチユーナ１５夫々に対するリモコンからの操作コードは全てテレビジョン受像機１４に入力され、システムケーブル３ｂを介してＡＶコントロールアンプ１２に供給されて処理された後、システムケーブル３ａ，３ｂ，３ｃを介してＶＴＲ１３，テレビジョン受像機１４，ＢＳチユーナ１５に供給される。ここで、ＡＶコントロールアンプ１２は夫々の機器をコントロールする機能を有しており、各機器の出力を一旦入力し、これを所望の機器に出力するスイツチとしての役割を果たすものである。このために、この出力を供給しようとする機器に対するヘツダーと入力された操作コードを含む制御信号を出力する。これにより、ＶＴＲ１３，テレビジョン受像機１４，ＢＳチユーナ15などは、夫々マイクロプロセサでヘツダーから自己に対する操作コードであるか否かを識別し、自己の操作コードであるときには、この操作コードに応じた動作を行なう。

また、ＶＴＲ１３やＢＳチユーナ１５では、その動作に連動してテレビジョン受像機１４などの他のＡＶ機器を動作させる必要がある場合、この他のＡＶ機器に対する操作コードを作成して送信する。これにより、ＡＶコントロールアンプ１２の上記の機能により、ＢＳチユーナ１５を動作させると同時に、ＶＴＲ１３を再生モードとした場合、ＶＴＲ１３の再生出力でテレビジョン受像機１４を画像表示し、ＢＳチユーナ１５の音声信号で音声を出させるというようなことも行なわせることができる。

第５図は第４図におけるＡＶコントロールアンプ１２と各システムケーブルとの接続手段の一具体例を示す図であつて、１６は差込口、１７ａ，１７ｂはプラグ、１８ａ，１８ｂは差込口であり、第４図に対応する部分には同一符号をつけている。

同図において、システムケーブル３ａの端部にはプラグ１７ａが設けられ、システムケーブル３ｂの端部にもプラグ１７ｂが設けられている。これらプラグ１７ａ，１７ｂはＡＶコントロールアンプ１２に設けられた差込口１６に差し込むことができ、これに差し込むことによつてシステムケーブル３ａ，３ｂがＡＶコントロールアンプ１２

に接続される。

また、各プラグ１７ａ，１７ｂにも差込口１８ａ，１８ｂが設けられている。プラグ１７ｂはプラグ１７ａの差込口１８ａに差し込むことができ、これによつて、システムケーブル３ａにシステムケーブル３ｂが接続される。逆に、プラグ１７ａもプラグ１７ｂの差込口１８ｂに差し込むことができ、これによつてシステムケーブル３ａがシステムケーブル３ｂに接続される。

第４図のＢＳチユーナ１５などの他のＡＶ機器に接続されるシステムケーブルの端部にも、同様のプラグが設けられており、全てのシステムケーブルが互いに接続可能である。

そこで、第５図において、システムケーブル３ａのプラグ１７ａをＡＶコントロールアンプ１２の差込口１６に差し込み、このプラグ１７ａの差込口１８ａにシステムケーブル３ｂのプラグ１７ｂを差し込み、以下順次各システムケーブルのプラグを差し込んでいくことにより、各ＡＶ機器がＡＶコントロールアンプ１２に接続される。

［発明の効果］

以上説明したように、本発明によれば、連動すべき複数のＡＶ機器を単一の操作でもつて連動動作させることが可能となり、ＡＶシステムの操作を簡略化して使い勝手が大幅に向上する。

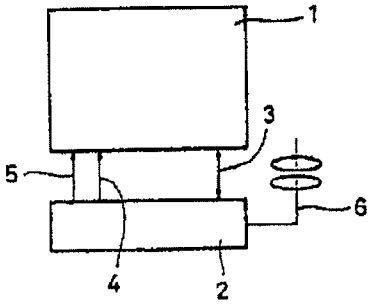
４．図面の簡単な説明

第１図～第３図は本発明によるＡＶコントロールシステムの一実施例を示すものであつて、第１図は全体構成図、第２図は操作コードの入力部の一具体例を示す図、第３図は操作コードの通信系を示す図、第４図は本発明によるＡＶコントロールシステムの他の実施例を示すブロック図、第５図は第４図におけるＡＶコントロールアンプと各システムケーブルとの接続手段の一具体例を示す図である。

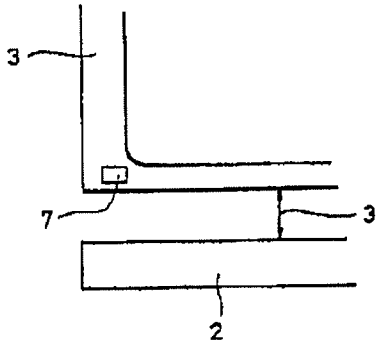
１……テレビジョン受像機、２……ＶＴＲ、３，３ａ，３ｂ，３ｃ……システムケーブル、７……受光部、８，９……受光素子、１０，１１……マイクロプロセサ、１２……ＡＶコントロールアンプ、１３……ＶＴＲ、１４……テレビジョン受像機、１５……ＢＳチユーナ。

代理人　弁理士　　武　顕次郎（外１名）

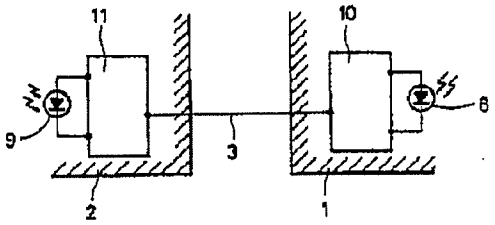
第１図



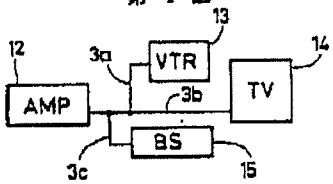
第２図



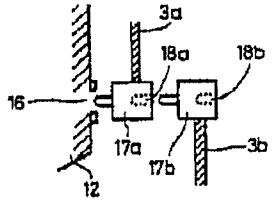
第 3 図


11
10
9
6
3
2
1

第 4 図


13
12
3a
VTR
14
AMP
3b
TV
BS
3c
15

第 5 図


3a
18a
18b
16
17a
17b
3b
12